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Vol. 931 Number 2

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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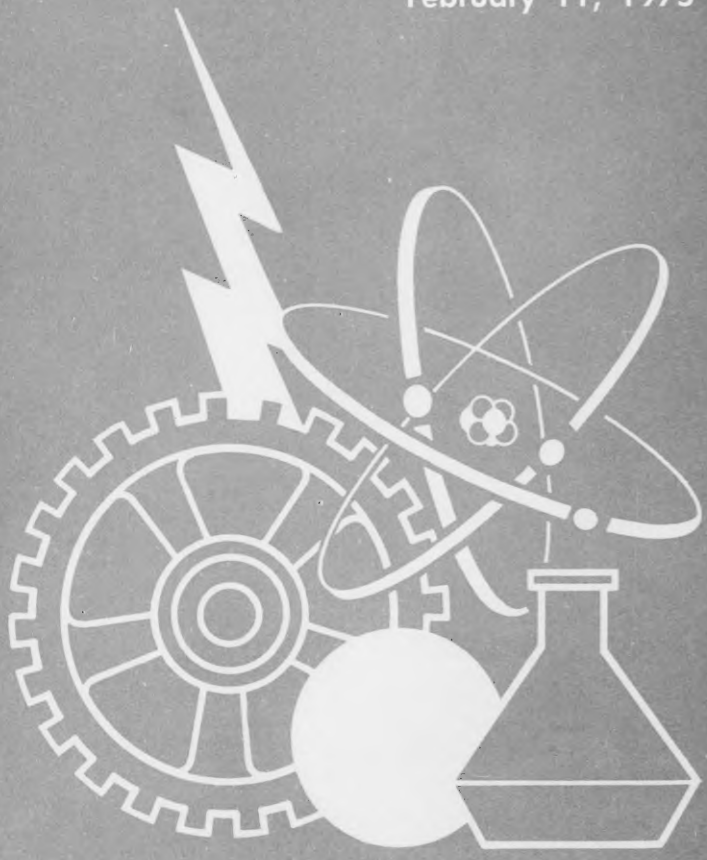
A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

PATENTS

February 11, 1975



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

February 11, 1975 Volume 931 Number 2

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# PATENT AND TRADEMARK OFFICE NOTICES

## Availability of Consolidated Listing

The "Consolidated Listing of Recent Official Gazette Notices—Re Patent Office Practices and Procedures" which appeared in the OFFICIAL GAZETTE of January 7, 1975 is available in separate reprints at a price of $1.60 from the Superintendent of Documents, Washington, D.C. 20402.

C. MARSHALL DANN,
Jan. 15, 1975 *Commissioner of Patents and Trademarks.*

## Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents on or before March 10, 1975.

Borchelt, Benjamin A., 4300 College Hgts. Dr., Hyattsville, Md. 20782
Eager, Thomas H., 4322 42nd St. NW., Washington, D.C. 20016
Garrett, Kenneth M., 214 King St. W., Toronto, Ontario, Canada
Gorman, Isaac J., 2714 Henderson Ave., Wheaton, Md. 20902
Millstein, Leo, 939 26th St. NW., #102, Washington, D.C. 20037
Rosdol, Leon D., 9502 Wire Ave., Silver Spring, Md. 20901
Sterman, Milton, 1304 Xaveria Dr., Silver Spring, Md. 20901
Wilkinson, Richard B., 11100 S. Glen Rd., Potomac, Md. 20854
Zitver, Leon, 6502 E. Halbert Rd., Bethesda, Md. 20034

LUTRELLE F. PARKER,
*Chairman, Committee on Enrollment.*

## Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

**2,704,209,** Halahan, Lyon and Aronson, PAPER FEEDING MECHANISM; **2,770,458,** same, PAPER FEEDER, **filed** June 9, 1971, D.C., S.D.N.Y., Doc. 71–C–2585, *Halm Instrument Co. Inc.* v. *Brandtjen & Kluge, Inc.* Filed defendant's stipulation of discontinuance with prejudice, Jan. 10, 1973.

**2,770,458.** (See 2,704,209.)

**2,774,087,** J. D. Bozza, METHOD FOR SECURING TOGETHER MOCCASIN VAMPS AND PLUGS; **2,946,069,** same, METHOD OF MANUFACTURING MOCCASINS; **2,999,323,** same, MOCCASINS AND FOOTWEAR, **filed** Nov. 21, 1968, D.C., S.D.N.Y., Doc. 68–C–4608, *The Jo-An Shoe Manufacturing Co., Inc.* v. *Conaway-Winter, Inc.* Filed stipulation and order of dismissal, Nov. 2, 1973.

**2,882,940,** C. Zellweger, FILLING VALVES FOR LIQUIFIED GAS LIGHTERS; **Re. 24,163,** same, VALVES FOR FILLING PYROPHORIC LIGHTERS FOR LIQUIFIED GAS, **filed** Mar. 11, 1964, D.C., S.D.N.Y., Doc. 64–C–779, *Ronson Corp. and La Nationale SA* v. *Zaima Corp. of America.* Stipulation and order of dismissal with prejudice, Feb. 22, 1973.

**2,939,707,** J. H. Lemelson, PLASTIC TOYS, **filed** Mar. 29, 1968, D.C., S.D.N.Y., Doc. 68–C–1286, *Jerome H. Lemelson* v. *Ideal Toy Corporation.* Filed Stipulation and order dismissing all claims and counterclaim in this action, Nov. 30, 1972.

**2,946,609.** (See 2,774,087.)

**2,975,495,** Wolf and Kaplan, COVERED BACKWASHERS, **filed** July 29, 1968, D.C., S.D.N.Y., Doc. 68–C–3077, *Peter S. Wolf, individually and doing business as Pivot Metal Works, et ano.* v. *Mershon Metal Specialties, Inc.* Filed plaintiff's dismissal pursuant to Rule 41(a)(1) with prejudice, Oct. 5, 1972.

**2,999,323.** (See 2,744,087.)

**3,075,330,** E. W. Swezey, APPARATUS FOR PACKAGING ARTICLES; **3,195,284,** W. B. Crane, Jr., APPARATUS AND METHOD FOR FORMING AND CLOSING A DISPLAY PACKAGE; **3,788,032,** Heffernan, Hair and Nielsen, METHOD AND APPARATUS FOR FORMING ARTICLES-HOLDING DISPLAY PACKAGES, **filed** July 17, 1974, D.C.N.J. (Newark), Doc. 74–1080, *International Inpak Inc.* v. *New Jersey Electronic Co.*

**3,149,431,** M. B. Blish, SELF-ALIGNING NECK CARD LABEL, **filed** Jan. 23, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c194, *Matthew B. Blish* v. *Goldblatt Bros. Inc. et al.* On stipulation of the parties, it is hereby adjudged that the complaint be dismissed with prejudice, May 17, 1973.

**3,243,917,** Giammarino and Brand, ELECTRICAL MOTOR OPERATED TOY VEHICLE, **filed** Aug. 22, 1969, D.C., S.D.N.Y., Doc. 69–C–3692, *Aurora Plastics Corp.* v. *Charles Merzbach Company Inc.* Filed stipulation and order of dismissal (R. 41(a)), Mar. 8, 1974.

**3,245,348,** Kesilman, Penn and Kravitz, COMMERCIAL DISH WASHER RACK, **filed** Jan. 28, 1969, D.C., S.D.N.Y., Doc. 69–C–335, *William Hodges & Co. and Green Valley Products* v. *The General Tire & Rubber Co.* Filed order that the complaint is dismissed with prejudice, Apr. 5, 1972.

**3,297,831,** W. O. Stanton, MAGNETIC STEREOPHONIC PHONOGRAPH PICKUP, **filed** Jan. 5, 1971, D.C., S.D.N.Y., Doc. 71–C–31, *Pickering & Company Inc.* v. *Brooks Radio and Television Corporation.* Filed consent judgment—ordered that defendants are perpetually enjoined and restrained as indicated, Feb. 17, 1971.

**3,195,284.** (See 3,075,330.)

**3,322,378,** C. T. Thompson, TRIPPED DRILL SUPPORT, **filed** Aug. 14, 1974, D.C., S.D. W. Va. (Charleston), Doc. CA 74–321–CH, *Joy Manufacturing Company* v. *Ingersoll-Rand Company.*

**3,339,744,** A. Ginsberg, TIE RACK, **filed** Oct. 24, 1972, D.C., S.D.N.Y., Doc. 72–C–4519, *Royal London Ltd.* v. *Swank Inc.* Dismissed voluntarily without prejudice, June 19, 1974.

**3,379,612,** De Stevens and Werner, PHARMACEUTICAL COMPOSITIONS OF 6-CHLORO-7-SULFAMYL-3,4-DIHYDRO-2H-[1,2,4]-BENZOTHIADIAZINE 1,1-DIOXIDE AND AN INDOLE ALKALOID OF THE APOCYNACEAE FAMILY, **filed** Aug. 9, 1974, D.C.N.J. (Newark), Doc. 74–1225, *Ciba-Geigy Corporation* v. *Merck & Co., Inc.*

**3,385,322,** K. A. Brandenberg, AND VALVE FOR FLUID LOGIC CIRCUITS; **3,389,720,** same, NOT VALVE FOR FLUID LOGIC CIRCUITS; **3,403,693,** same, OR VALVE FOR FLUID LOGIC CIRCUITS; **3,419,032,** same, DIFFERENTIATOR VALVE FOR FLUID LOGIC CIRCUITS, **filed** July 3, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1732, *The ARO Corporation* v. *Flick Reedy Corp.* By agreement cause dismissed with prejudice, May 2, 1974.

**3,387,147,** J. A. Radwan, MUSCLE STIMULATING PULSE GENERATOR, **filed** Oct. 8, 1968, D.C., S.D.N.Y., Doc. 68–C–3955, *Dynatone Electronics Corporation* v. *Equality Products, Inc.* Filed order dismissing action for lack of prosecution without prejudice, Sept. 22, 1972.

**3,389,720.** (See 3,385,322.)

**3,403,693.** (See 3,385,322.)

**3,419,032.** (See 3,385,322.)

**3,422,189,** J. A. Rider, METHOD AND COMPOSITIONS FOR THE TREATMENT OF GASTRO-INTESTINAL DISORDERS, **filed** July 15, 1969, D.C., N.D. Ill. (Chicago), Doc. 69c1471, *Moraine Products, Inc.* v. *Block Drug Company, Inc.* Case dismissed pending outcome of action in Eastern District of Michigan, Apr. 27, 1973.

**3,443,459,** Mackey and Mackey, Jr., DRILL; **3,521,405,** Mackey, Jr. and Naureckas, DRILL GRINDING APPARATUS; **3,592,555,** B. A. Mackey, Sr., DRILL WITH DISCONTINUOUS CUTTING LIPS; **3,656,264,** Mackey, Jr. and Naureckas, METHOD OF GRINDING DRILLS, **filed** Feb. 25, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c521, *International Carbide Corporation et al.* v. *Donald H. Geiger.* Memorandum opinion and order—defendant's motion to dismiss the complaint is granted, May 22, 1974.

**3,519,617,** Rast and Steiner, RED PHENYL-AZO-NAPHTHOL DYESTUFFS FOR EDIBLE COMPOSITIONS; **3,640,733,** same, EDIBLE SUBSTRATES COLORED WITH MONOAZO DYESTUFFS, **filed** Apr. 2, 1974, D.C., E.D. Mo. (St. Louis), Doc. 74–240–C (1), *Warner-Jenkinson Company*

v. *Allied Chemical Corp.* Stipulation and order of dismissal without prejudice, filed July 3, 1974.

**3,521,405.** (See 3,443,459.)

**3,592,555.** (See 3,443,459.)

**3,640,733.** (See 3,519,617.)

**3,648,075,** R. J. Mankovitz, ZERO VOLTAGE SWITCHING AC RELAY CIRCUIT, **filed** Aug. 23, 1974, D.C., C.D. Calif. (Los Angeles), Doc. CV 74-2473, *Teledyne, Inc.* v. *International Rectifier Corporation.*

**3,656,264.** (See 3,443,459.)

**3,752,105,** R. L. Hackett, RUDDER CONSTRUCTION FOR SAILBOATS; **3,756,182,** same, CENTERBOARD FOR SAILBOATS, **filed** Aug. 13, 1974, D.C., W.D. Mich. (Grand Rapids), Doc. G 74-296-CA 7, *Richard L. Hackett* v. *Anchor Fibreglass Products Corp. and Control Engineering Company.*

**3,752,433,** M. R. Berman, TRANSLUCENT PLASTIC CANDLE MOLD, **filed** Jan. 17, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c147, *Avalon Industries, Inc.* v. *Rapco, Inc.*

**3,756,182.** (See 3,752,105.)

**3,788,032.** (See 3,075,330.)

**Re. 24,163.** (See 2,882,940.)

## Change in Name of the Patent Office

(Public Law 93-596)

On January 2, 1975, President Ford signed into law H.R. 7599, a bill changing the name of the Patent Office to the "Patent and Trademark Office" and the title of the Commissioner of Patents to the "Commissioner of Patents and Trademarks." This change reflects the dual role of the Patent Office in administering both the patent law (Title 35, United States Code) and the Trademark Act of 1946 (60 Stat 427, 15 U.S.C. 1051, et seq.)

In order to minimize the cost of implementing this law (P.L. 93-596) and because of the similarity of the old and new names, existing stationery, printed forms, publications, etc. will continue in use until such supplies are exhausted. During the interim, the terms "Patent Office" and "Commissioner of Patents," appearing on patent grants and other official documents issued or dated on and after January 2, 1795, shall be construed to mean "Patent and Trademark Office" and "Commissioner of Patents and Trademarks." This same interpretation shall apply to the use of these terms in the patent and trademark rules of practice, 37 CFR, Parts 1 and 2, until such time as the Code of Federal Regulations is revised and new rules of practice are published.

In addition, the public is encouraged to minimize its costs in complying with this new law by exhausting reasonable quantities of existing stationery and forms which contain printed reference to the Patent and Trademark Office as the the Patent office and the Commissioner of Patents and Trademarks as the Commissioner of Patents. In preparing other written matter for submission to the Patent and Trademark Office, the public should use the new deisgnations.

C. MARSHALL DANN,
*Commissioner of Patents and Trademarks.*

Approved: Jan. 27, 1975.

BETSY ANCKER-JOHNSON, PH.D.,
*Assistant Secretary for Science and Technology.*

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Public Law 93-596
93rd Congress, H. R. 7599
January 2, 1975

# An Act

88 STAT. 1949

**To amend the Trademark Act of 1946 and title 35 of the United States Code to change the name of the Patent Office to the "Patent and Trademark Office".**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Patent Office. Name change.

SECTION 1. The Trademark Act of 1946, 60 Stat. 427, as amended (15 U.S.C. sec. 1051 et seq. (1970)), and title 35 of the United States Code, entitled "Patents", are amended by striking out each time they appear "Patent Office" and "Commissioner of Patents" and inserting in lieu thereof "Patent and Trademark Office" and "Commissioner of Patents and Trademarks", respectively.

35 USC 1 et seq.

SEC. 2. Section 29 of the Trademark Act of 1946 is further amended by striking out "Reg. U.S. Pat. Off." and inserting in lieu thereof "Reg. U.S. Pat. & Tm. Off."

15 USC 1111.

SEC. 3. The terms "Patent Office" and "Commissioner of Patents" in all laws of the United States shall mean "Patent and Trademark Office" and "Commissioner of Patents and Trademarks", respectively.

35 USC 1 note.

SEC. 4. This Act shall become effective upon enactment. However, any registrant may continue to give notice of his registration in accordance with section 29 of the Trademark Act of 1946 (60 Stat. 427), as amended Oct. 9, 1962 (76 Stat. 769), as an alternative to notice in accordance with section 29 of the Trademark Act as amended by section 2 of this Act, regardless of whether his mark was registered before or after the effective date of this Act.

Effective date. 15 USC 1111 note.

Approved January 2, 1975.

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LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-523 (Comm. on the Judiciary).
SENATE REPORT No. 93-1399 (Comm. on the Judiciary).
CONGRESSIONAL RECORD:
Vol. 119 (1973): Oct. 15, considered and passed House.
Vol. 120 (1974): Dec. 18, considered and passed Senate.

Public Law 93-600
93rd Congress, H. R. 8981
January 2, 1975

# An Act

88 STAT. 1955

To amend the Trademark Act to extend the time for filing oppositions, to eliminate the requirement for filing reasons of appeal in the Patent Office, and to provide for awarding attorney fees.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Trademarks. Extension for filing oppositions. 15 USC 1063.

SECTION 1. Section 13 of the Trademark Act of 1946 (60 Stat. 427), as amended, is amended by deleting the second sentence and substituting therefor: "Upon written request prior to the expiration of the thirty-day period, the time for filing opposition shall be extended for an additional thirty days, and further extensions of time for filing opposition may be granted by the Commissioner for good cause. The Commissioner shall notify the applicant of each extension of the time for filing opposition.".

15 USC 1071.

SEC. 2. Section 21 of the Trademark Act of 1946 (60 Stat. 427), as amended, is amended by deleting subsections (2), (3), and (4) from paragraph (a) and substituting therefor:

Notice of appeal.

"(2) Such an appeal to the United States Court of Customs and Patent Appeals shall be taken by filing a notice of appeal with the Commissioner, within sixty days after the date of the decision appealed from or such longer time after said date as the Commissioner appoints. The notice of such appeal shall specify the party or parties taking the appeal, shall designate the decision or part thereof appealed from, and shall state that the appeal is taken to said court.

Hearing, notice.

"(3) The court shall, before hearing such appeal, give notice of the time and place of the hearing to the Commissioner and the parties thereto. The Commissioner shall transmit to the court certified copies of all the necessary original papers and evidence in the case specified by the appellant and any additional papers and evidence specified by the appellee, and in an ex parte case the Commissioner shall furnish the court with a brief explaining the grounds of the decision of the Patent Office, touching all the points involved in the appeal.

"(4) The court shall decide such appeal on the evidence produced before the Patent Office. The court shall return to the Commissioner a certificate of its proceedings and decision, which shall be entered of record in the Patent Office and govern further proceedings in the case.".

Attorney fees. 15 USC 1117.

SEC. 3. Section 35 of the Trademark Act of 1946 (60 Stat. 427), as amended, is amended by adding the following sentence at the end thereof: "The court in exceptional cases may award reasonable attorney fees to the prevailing party.".

Effective date. 15 USC 1063 note.

SEC. 4. This Act shall become effective upon enactment, but shall not affect any suit, proceeding, or appeal then pending.

Approved January 2, 1975.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-524 (Comm. on the Judiciary).
SENATE REPORT No. 93-1400 (Comm. on the Judiciary).
CONGRESSIONAL RECORD:
Vol. 119 (1973): Oct. 15, considered and passed House.
Vol. 120 (1974): Dec. 18, considered and passed Senate.

Public Law 93-601
93rd Congress, H. R. 9199
January 2, 1975

# An Act

88 STAT. 1956

To amend title 35, United States Code, "Patents", and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section 3, title 35, of the United States Code is amended to read as follows:

Patents.

**"§ 3. Officers and employees**

35 USC 3.

"(a) There shall be in the Patent Office a Commissioner of Patents, a Deputy Commissioner, two Assistant Commissioners, and not more than fifteen examiners-in-chief. The Deputy Commissioner, or, in the event of a vacancy in that office, the Assistant Commissioner senior in date of appointment shall fill the office of Commissioner during a vacancy in that office until the Commissioner is appointed and takes office. The Commissioner of Patents, the Deputy Commissioner, and the Assistant Commissioners shall be appointed by the President, by and with the advice and consent of the Senate. The Secretary of Commerce, upon the nomination of the Commissioner, in accordance with law, shall appoint all other officers and employees.

"(b) The Secretary of Commerce may vest in himself the functions of the Patent Office and its officers and employees specified in this title and may from time to time authorize their performance by any other officer or employee.

"(c) The Secretary of Commerce is authorized to fix the per annum rate of basic compensation of each examiner-in-chief in the Patent Office at not in excess of the maximum scheduled rate provided for positions in grade 17 of the General Schedule of the Classification Act of 1949, as amended."

5 USC 5332 note.

SEC. 2. The first paragraph of section 7 of title 35 of the United States Code is amended to read as follows:

Board of Appeals.

"The examiners-in-chief shall be persons of competent legal knowledge and scientific ability, who shall be appointed under the classified civil service. The Commissioner, the deputy commissioner, the assistant commissioners, and the examiners-in-chief shall constitute a Board of Appeals, which on written appeal of the applicant, shall review adverse decisions of examiners upon applications for patents. Each appeal shall be heard by at least three members of the Board of Appeals, the members hearing such appeal to be designated by the Commissioner. The Board of Appeals has sole power to grant rehearings."

Review.

SEC. 3. The last sentence of section 151 of title 35 of the United States Code is amended to read as follows: "If any payment required by this section is not timely made, but is submitted with the fee for delayed payment and the delay in payment is shown to have been unavoidable, it may be accepted by the Commissioner as though no abandonment or lapse had ever occurred.".

Delayed payment.

SEC. 4. (a) The Commissioner of Patents may, in accordance with Section 3 of this Act, accept late payment of issue fees, the payment of which was governed by the provisions of Public Law 89-93; *Provided:* the term of the patent for which late payment of such an issue fee is accepted shall expire earlier than the time specified in Section 154 of Title 35, United States Code, by a period equal to the delay between the time the application became abandoned or the patent lapsed for failure to pay the issue fee and the time the late payment is accepted after enactment of this Act; *Further Provided:* no patent with respect to which the payment of the issue fee was governed by the provisions of PL 89-83 and for which a late payment of the issue fee is accepted under the authority created by Section 3

Issue fees, late payment.
35 USC 151 note.
35 USC 41.

88 STAT. 1957

of this Act, shall abridge or affect the right of any person or his successors in business who made, purchased or used anything covered by the patent, after the date of the application became abandoned or patent lapsed for failure to pay the issue fee but prior to the grant or restoration of the patent, to continue the use of or to sell to others to be used or sold, the specific thing so made, purchased, or used. A court before which such matter is in question may provide for the continued manufacture, use or sale of the thing made, purchased or used as specified, or for the manufacture, use or sale of which substantial preparation was made after the date the application became abandoned or patent lapsed for failure to pay the fee but prior to the grant or restoration of the patent, and it may also provide for the continued practice of any process covered by the patent, practiced, or for the practice of which substantial preparation was made, after the date the application became abandoned or patent lapsed for failure to pay the issue fee but prior to the grant or restoration of the patent, to the extent and under such terms as the court deems equitable for the protection of investments made or business commenced before the grant or restoration of the patent.

Effective date. 35 USC 3 note.

(b) This Act shall be effective upon enactment. Examiners-in-chief in office on the date of enactment shall continue in office under and in accordance with their then existing appointments.

Approved January 2, 1975.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-856 (Comm. on the Judiciary).
SENATE REPORT No. 93-1401 (Comm. on the Judiciary).
CONGRESSIONAL RECORD, Vol. 120 (1974):
Mar. 18, considered and passed House.
Dec. 18, considered and passed Senate.

## Certificates of Correction for the Week of Feb. 11, 1975

| | | | |
|---|---|---|---|
| D. 232,051 | 3,816,407 | 3,840,308 | 3,848,651 |
| D. 232,560 | 3,816,904 | 3,840,484 | 3,848,918 |
| D. 233,495 | 3,818,046 | 3,840,606 | 3,849,030 |
| D. 233,760 | 3,819,470 | 3,840,639 | 3,849,380 |
| 3,423,505 | 3,819,886 | 3,840,728 | 3,849,424 |
| 3,497,215 | 3,821,331 | 3,840,958 | 3,849,618 |
| 3,551,797 | 3,821,413 | 3,841,324 | 3,849,817 |
| 3,605,068 | 3,822,188 | 3,841,567 | 3,849,968 |
| 3,607,493 | 3,822,152 | 3,841,735 | 3,850,423 |
| 3,609,144 | 3,823,192 | 3,841,855 | 3,850,508 |
| 3,628,327 | 3,824,198 | 3,841,938 | 3,850,615 |
| 3,656,621 | 3,824,223 | 3,842,041 | 3,850,758 |
| 3,665,302 | 3,825,717 | 3,842,046 | 3,850,784 |
| 3,678,910 | 3,826,130 | 3,842,061 | 3,850,794 |
| 3,691,390 | 3,826,673 | 3,842,331 | 3,850,814 |
| 3,705,918 | 3,827,070 | 3,842,386 | 3,850,823 |
| 3,709,926 | 3,828,909 | 3,842,545 | 3,850,903 |
| 3,721,350 | 3,829,463 | 3,842,728 | 3,851,077 |
| 3,724,758 | 3,829,685 | 3,842,743 | 3,851,161 |
| 3,725,361 | 3,830,021 | 3,842,997 | 3,851,266 |
| 3,738,991 | 3,830,214 | 3,843,019 | 3,851,333 |
| 3,742,152 | 3,830,194 | 3,843,355 | 3,851,342 |
| 3,752,251 | 3,830,287 | 3,843,433 | 3,851,552 |
| 3,754,003 | 3,830,401 | 3,843,721 | 3,851,614 |
| 3,756,915 | 3,830,541 | 3,843,740 | 3,851,647 |
| 3,757,823 | 3,830,926 | 3,843,841 | 3,851,688 |
| 3,759,481 | 3,831,026 | 3,844,090 | 3,851,714 |
| 3,761,510 | 3,831,492 | 3,844,126 | 3,851,719 |
| 3,771,628 | 3,831,849 | 3,844,269 | 3,851,868 |
| 3,772,385 | 3,832,140 | 3,844,287 | 3,851,946 |
| 3,775,407 | 3,832,331 | 3,844,667 | 3,851,965 |
| 3,780,273 | 3,832,401 | 3,845,117 | 3,852,092 |
| 3,782,109 | 3,832,554 | 3,845,224 | 3,852,095 |
| 3,784,594 | 3,833,365 | 3,845,346 | 3,852,217 |
| 3,786,874 | 3,833,517 | 3,845,378 | 3,852,246 |
| 3,788,728 | 3,833,539 | 3,845,475 | 3,852,537 |
| 3,788,824 | 3,833,959 | 3,845,477 | 3,853,111 |
| 3,792,980 | 3,834,217 | 3,846,130 | 3,853,130 |
| 3,795,456 | 3,834,362 | 3,846,294 | 3,853,363 |
| 3,797,341 | 3,835,047 | 3,846,357 | 3,853,375 |
| 3,798,054 | 3,835,216 | 3,846,707 | 3,853,804 |
| 3,799,742 | 3,835,365 | 3,846,753 | 3,853,857 |
| 3,801,317 | 3,835,460 | 3,847,269 | 3,854,026 |
| 3,803,129 | 3,837,340 | 3,847,584 | 3,854,039 |
| 3,807,090 | 3,837,838 | 3,847,754 | 3,854,148 |
| 3,808,190 | 3,837,849 | 3,847,959 | 3,854,183 |
| 3,808,234 | 3,838,249 | 3,847,991 | 3,854,212 |
| 3,808,294 | 3,838,438 | 3,848,127 | 3,855,014 |
| 3,809,704 | 3,838,610 | 3,848,132 | 3,855,086 |
| 3,813,457 | 3,838,628 | 3,848,242 | 3,855,680 |
| 3,814,101 | 3,839,043 | 3,848,359 | 3,856,064 |
| 3,814,111 | 3,839,312 | 3,848,552 | 3,856,343 |
| 3,814,628 | 3,839,343 | 3,848,558 | 3,857,046 |
| 3,815,096 | 3,839,478 | 3,848,628 | |
| 3,815,384 | 3,839,849 | | |

## Disclaimers

3,335,351.—*Herbert E. Morris,* Roanoke, Va. DC MOTOR CONTROL CIRCUIT. Patent dated Aug. 8, 1967. Disclaimer filed June 6, 1974, by the assignee, *General Electric Company.*

Hereby enters this disclaimer to all claims of said patent.

3,576,539.—*George H. Huber,* Cinnaminson, and *Kenrick O. Stephenson, Jr.,* Upper Montclair, N.J. COUNTER CONTROLLER CREDIT VERIFICATION SYSTEM. Patent dated Apr. 27, 1971. Disclaimer filed Sept. 15, 1972, by the assignee, *Digital Data Systems Corp.*

Hereby enters this disclaimer to claims 22 and 25 of said patent.

3,581,641.—*Hubert Nerwin,* Rochester, N.Y. FILM CARTRIDGE AND CAMERA. Patent dated June 1, 1971. Disclaimer filed June 22, 1972, by the assignee, *Eastman Kodak Company.*

Hereby enters this disclaimer to claims 1–12 of said patent.

3,696,891.—*Lloyd Richard Poe,* Beverly Hills, Calif. ENERGY ABSORBING DEVICE. Patent dated Oct. 10, 1972. Disclaimer filed July 6, 1973, by the assignee, *Hartwell Corporation.*

Hereby enters this disclaimer to claims 1, 3 and 7 of said patent.

3,744,039.—*George W. Hrbek,* Arlington Heights, *Adrianus Korpel,* Prospect Heights, and *William H. Watson,* Roselle, Ill. SINGLE-LASER SIMULTANEOUS MULTIPLE-CHANNEL CHARACTER GENERATION SYSTEM. Patent dated July 3, 1973. Disclaimer filed Oct. 17, 1974, by the assignee, *Zenith Radio Corporation.*

Hereby enters this disclaimer to claims 1–8, 10, 11 and 13–19 of said patent.

3,809,017.—*Michael Eskeli,* Dallas, Tex. HEAT AND STEAM GENERATOR. Patent dated May 7, 1974. Disclaimer filed Apr. 4, 1974, by the inventor.

Hereby enters this disclaimer to claim 16 of said patent.

## Dedication

2,975,073.—*Herbert K. De Long* and *Donald E. Ritzema,* Midland, Mich. CORROSION RESISTANCE OF ELECTROLESS NICKEL PLATE. Patent dated Mar. 14, 1961. Dedication filed Aug. 9, 1974, by the assignee, *The Dow Chemical Company.*

Hereby dedicates to the Public the remaining term of said patent.

## Disclaimer and Dedication

3,827,745.—*Billy Gene Pugh,* Corpus Christi, Tex. PERSONNEL OR CARGO NET. Patent dated Aug. 6, 1974. Disclaimer and dedication filed Oct. 4, 1974, by the inventor.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

## Service by Publication

John T. Urton

In accordance with Rule 47(b) of the Rules of Practice of the United States Patent Office in Patent Cases, notice is hereby given of the filing on February 4, 1974, of an application for patent entitled "Injectable Adjuvant and Compositions Including Such Adjuvant," and identifying John T. Urton, whose last known address is 6840 Delmar, Prairie Village, Kansas 66208, as a joint inventor. The application was made in compliance with Rule 47(b) and 35 U.S.C. 118 by Haver-Lockhart Laboratories, Inc. without execution by the said John T. Urton.

Any action to be taken by the said John T. Urton in connection with the said application must be taken within thirty days of the publication of this notice.

WILLIAM FELDMAN,
*Acting Assistant Commissioner for Patents.*

## National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

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The inventions listed below are owned by the U.S. Government and are available for licensing in accordance with the licensing policy of each agency-sponsor.

Copies of patents are available from the Commissioner of Patents, Washington, D.C. 20231, at $.50 each. Requests for copies of patents must include the patent number.

Copies of patent applications, either paper copy (PC) or microfiche (MF), can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161, at the prices cited. Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid

premature disclosure in the event of an interference before the Patent Office. Claims and other technical data can usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information should be directed to the address cited below for each agency.

DOUGLAS J. CAMPION,
*Patent Program Coordinator,*
*National Technical Information Service.*

U.S. ATOMIC ENERGY COMMISSION
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 468,314. Shocked Plate Metal Atom Oxidation Laser. Filed May 9, 1974. PC $3.25/MF $2.25.

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Patent 3,805,076. Noble Gas Scintillator for Measuring Neutron Flux. Filed May 8, 1973. Patented Apr. 16, 1974. Not available NTIS.

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DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

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Patent application 471,931. System for Intensification of Weak Absorption and Collection of Weak Light Emission. Filed May 21, 1974. PC $3.25/MF $2.25.

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DEPARTMENT OF AGRICULTURE
Chief, Research Agreements and Patent Mgmt. Branch,
Hyattsville, Md. 20782

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ENVIRONMENTAL PROTECTION AGENCY
Room W513, 401 M St. SW., Washington, D.C. 20460

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DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
National Institutes of Health, Bethesda, Md. 20014

Patent application 487,032. Cage for Continuous Infusion. Filed July 10, 1974. PC $3.25/MF $2.25.

Patent 3,833,724. Treatment of Sickle Cell Anemia. Filed Sept. 15, 1971. Patented Sept. 3, 1974. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA—
Code GP–2, Washington, D.C. 20546

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U.S. ATOMIC ENERGY COMMISSION

Assistant General Counsel for Patents, Washington, D.C. 20545

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**Patent 3,804,765. Adjusting Ferroelectric Ceramic Characteristics During Formation Thereof. Filed June 13, 1972. Patented Apr. 16, 1974. Not available NTIS.**

**Patent 3,811,778. Isotope-Shift Zeeman Effect Spectrometer. Filed Feb. 28, 1973. Patented May 21, 1974. Not available NTIS.**

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**Patent 3,815,619. Fast Acting Valve. Filed Aug. 31, 1972. Patented June 11, 1974. Not available NTIS.**

DEPARTMENT OF THE AIR FORCE

AF/JACP, Washington, D.C. 20314

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**Patent application 478,501. Far Infrared Waveguide Laser. Filed June 12, 1974. PC $3.25/MF $2.25.**

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**Patent application 480,770. RF Generator. Filed June 19, 1974. PC $3.25/MF $2.25.**

**Patent 3,730,461. Stability Augmentation System for Light Aircraft Providing Pilot Assist and Turn. Filed May 5, 1971. Patented May 1, 1973. Not available NTIS.**

**Patent 3,736,377. Multiple Channel Video Switching System. Filed May 10, 1971. Patented May 29, 1973. Not available NTIS.**

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**Patent 3,775,118. Photomechanical Method of Producing Grounded Printed Circuits. Filed Dec. 14, 1971. Patented Nov. 27, 1973. Not available NTIS.**

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**Patent 3,823,600. Pneumatic Linear Accelerator. Filed Apr. 9, 1973. Patented July 16, 1974. Not available NTIS.**

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**Patent 3,823,951. Unbonded Flexure Seal Design. Filed Sept. 7, 1972. Patented July 16, 1974. Not available NTIS.**

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**Patent 3,824,532. Seismic Signal Intrusion Detection Classification System. Filed Sept. 27, 1971. Patented July 16, 1974. Not available NTIS.**

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**Patent 3,826,056. Module Construction System. Filed June 7, 1972. Patented July 30, 1974. Not available NTIS.**

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ENVIRONMENTAL PROTECTION AGENCY

Room W513, 401 M St. SW., Washington, D.C. 20460

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**Patent 3,829,363. Process for the Production of High Quality Fungal Protein From Starch and Starchy Processing Wastes. Filed June 29, 1972. Patented Aug. 13, 1974. Not available NTIS.**

U.S. DEPARTMENT OF THE INTERIOR

Branch of Patents, 18th and C Sts. NW., Washington, D.C. 20240

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U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

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**Patent 3,728,549. In situ Device for Measuring Light Scattering. Filed Apr. 12, 1972. Patented Apr. 17, 1973. Not available NTIS.**

**Patent 3,729,238. Self-Aligning, Adjustable Anchor Pin Assembly. Filed Sept. 13, 1971. Patented Apr. 24, 1973. Not available NTIS.**

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**Patent 3,733,544. Method for Evaluating Electrostatic Propensity of Fabrics and Soft Sheeting Materials. Filed Feb. 24, 1972. Patented May 15, 1973. Not available NTIS.**

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**Patent 3,734,982. Process for Case Bonding Cast Composite Propellant Grains. Filed Feb. 2, 1962. Patented May 22, 1973. Not available NTIS.**

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**Patent 3,735,150. Low Noise Phase Detector. Filed Dec. 21, 1971. Patented May 22, 1973. Not available NTIS.**

**Patent 3,735,154. Disabling Circuit Having a Predetermined Disabling Interval. Filed Nov. 19, 1971. Patented May 22, 1973. Not available NTIS.**

**Patent 3,735,227. Direct Current Motor Starter Circuit. Filed Jan. 24, 1972. Patented May 22, 1973. Not available NTIS.**

**Patent 3,735,270. Delayed Pulse Generator. Filed Mar. 20, 1972. Patented May 22, 1973. Not available NTIS.**

**Patent 3,735,271. Pulse Width Coded Signal Detector. Filed Oct. 22, 1971. Patented May 22, 1973. Not available NTIS.**

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**Patent 3,735,288. Phase Modulator. Filed Dec. 29, 1971. Patented May 22, 1973. Not available NTIS.**

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**Patent 3,735,411. High-Range Resolution Radar Real-Time Display Apparatus. Filed Aug. 11, 1971. Patented May 22, 1973. Not available NTIS.**

Patent 3,735,425. Myoelectrically Controlled Prosthesis. Filed Feb. 10, 1971. Patented May 29, 1973. Not available NTIS.

Patent 3,735,598. Diver's Belt and Method of Manufacture. Filed Dec. 9, 1971. Patented May 29, 1973. Not available NTIS.

Patent 3,735,707. Fluidically Controlled Pneumatic to Mechanical Converters. Filed Apr. 29, 1971. Patented May 29, 1973. Not available NTIS.

Patent 3,736,018. Hydraulic Claw With Locking Mechanism. Filed Sept. 10, 1971. Patented May 29, 1973. Not available NTIS.

Patent 3,736,194. Method of Preparing a Composite Explosive With a Water-Wet Energetic Compound. Filed Feb. 18, 1966. Patented May 29, 1973. Not available NTIS.

Patent 3,736,745. Supercritical Thermal Power System Using Combustion Gases for Working Fluid. Filed June 9, 1971. Patented June 5, 1973. Not available NTIS.

Patent 3,736,749. Open Loop On-Demand Variable Flow Gas Generator System With a Two-Position Injector. Filed Aug. 20, 1971. Patented June 5, 1973. Not available NTIS.

Patent 3,736,790. Apparatus for Non-Destructively Testing Fuel Filters. Filed Aug. 26, 1971. Patented June 5, 1973. Not available NTIS.

Patent 3,736,791. Gyro Axis Perturbation Technique for Calibrating Inertial Navigation Systems. Filed Aug. 18, 1967. Patented June 5, 1973. Not available NTIS.

Patent 3,736,876. Catalyst Generator. Filed June 26, 1970. Patented June 5, 1973. Not available NTIS.

Patent 3,737,250. Fiber Blade Attachment. Filed June 16, 1971. Patented June 5, 1973. Not available NTIS.

Patent 3,737,790. Noise-Riding Slicer. Filed Dec. 21, 1971. Patented June 5, 1973. Not available NTIS.

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Patent 3,738,775. Constant Pressure Liquid Supply System. Filed Oct. 7, 1971. Patented June 12, 1973. Not available NTIS.

Patent 3,738,922. Electropolishing Bath Solution. Filed Jan. 20, 1972. Patented June 12, 1973. Not available NTIS.

Patent 3,739,351. Phase Control Circuits. Filed Feb. 22, 1972. Patented June 12, 1973. Not available NTIS.

Patent 3,739,370. Plotting Projector. Filed Oct. 27, 1971. Patented June 12, 1973. Not available NTIS.

Patent 3,739,411. Low Frequency Wave Absorbing Device. Filed Nov. 9, 1971. Patented June 19, 1973. Not available NTIS.

Patent 3,740,636. Charge Regulator and Monitor for Spacecraft Solar Cell/Battery System Control. Filed Nov. 5, 1971. Patented June 19, 1973. Not available NTIS.

Patent 3,740,643. Apparatus for Measuring the Distance Between a Workpiece Surface and a Datum. Filed Aug. 30, 1971. Patented June 19, 1973. Not available NTIS.

Patent 3,741,143. Hull Inspection Platform. Filed Dec. 30, 1971. Patented June 26, 1973. Not available NTIS.

Patent 3,742,884. Buoyancy Transport Vehicle Control Console. Filed Mar. 23, 1972. Patented July 3, 1973. Not available NTIS.

Patent 3,743,012. Controlled Temperature Garment. Filed July 28, 1971. Patented July 3, 1973. Not available NTIS.

Patent 3,744,280. High Security Locking Mechanism. Filed July 28, 1972. Patented July 10, 1973. Not available NTIS.

Patent 3,744,782. Torsional Shear Damped Foundation Member. Filed Apr. 25, 1972. Patented July 10, 1973. Not available NTIS.

Patent 3,745,353. Bragg Angle Collinear Heterodyning Filter. Filed Oct. 26, 1971. Patented July 10, 1973. Not available NTIS.

Patent 3,745,374. Logarithmic Amplifier and Limiter. Filed Jan. 26, 1972. Patented July 10, 1973. Not available NTIS.

Patent 3,745,976. Resilient Marine Mammal Nose Cup. Filed Dec. 30, 1971. Patented July 17, 1973. Not available NTIS.

Patent 3,746,624. 48-Hour Test for Streptococcus Mutans in Plaque. Filed Apr. 21, 1972. Patented July 17, 1973. Not available NTIS.

Patent 3,747,627. Pressure Regulator and Compensator. Filed June 8, 1972. Patented July 24, 1973. Not available NTIS.

Patent 3,748,180. Fuel Cell System for Underwater Vehicle. Filed Mar. 30, 1972. Patented July 24, 1973. Not available NTIS.

Patent 3,748,292. Corrosion Resistant Primer Coating for Aluminum Surfaces Containing Strontium Chromate and Magnesium Powder. Filed Jan. 18, 1972. Patented July 24, 1973. Not available NTIS.

Patent 3,748,899. Conductivity and Temperature Sensing Probe. Filed June 12, 1972. Patented July 31, 1973. Not available NTIS.

Patent 3,752,103. Control System for Submersibles To Minimize Bottom Sediment Disturbances. Filed Jan. 24, 1972. Patented Aug. 14, 1973. Not available NTIS.

Patent 3,752,267. Disc Brake Mechanism. Filed Dec. 7, 1971. Patented Aug. 14, 1973. Not available NTIS.

Patent 3,752,429. Three Axis Simulator. Filed July 3, 1972. Patented Aug. 14, 1973. Not available NTIS.

Patent 3,753,911. High Strength Barium Titanate Ceramic Bodies. Filed June 24, 1971. Patented Aug. 21, 1973. Not available NTIS.

Patent 3,754,438. Load Measuring Device. Filed May 25, 1972. Patented Aug. 28, 1973. Not available NTIS.

Patent 3,754,551. Portable Collapsible Recompression Chamber. Filed Sept 20, 1972. Patented Aug. 28, 1973. Not available NTIS.

Patent 3,755,627. Programmable Feature Extractor and Speech Recognizer. Filed Dec. 22, 1971. Patented Aug. 28, 1973. Not available NTIS.

Patent 3,711,362. Fluid Velocity Indicator. Filed May 25, 1972. Patented Nov. 13, 1973. Not available NTIS.

Patent 3,774,718. In-Situ Accoustic Sediment Probe. Filed May 25, 1972. Patented Nov. 27, 1973. Not available NTIS.

Patent 3,774,983. Low Friction Bearing-Journal Arrangement. Filed Dec. 27, 1971. Patented Nov. 27, 1973. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

Patent application 395,495. Multiparameter Vision Tester. Filed Sept. 10, 1973. PC $4.25/MF $2.25.

Patent application 415,486. Refinement Control in Tig Arc Welding. Filed Nov. 13, 1973. PC $3.25/MF $2.25.

Patent application 446,560. Space Mirrors. Filed Feb. 27, 1974. PC $3.25/MF $2.25.

Patent application 491,416. Measurement of Gas Production of Microorganisms. Filed July 24, 1974. PC $3.25/MF $2.25.

Patent application 500,979. Variable Beamwidth Antenna. Filed Aug. 27, 1974. PM $3.25/MF $2.25.

Patent application 501,011. Analog to Digital Converter. Filed Aug. 27, 1974. PC $3.25/MF $2.25.

Patent application 501,013. Schottky Barrier Laser Energy Converter. Filed Aug. 27, 1974. PC $3.25/MF $2.25.

Patent application 502,137. Apparatus for Positioning Modular Components on a Vertical or Overhead Surface. Filed Aug. 30, 1974. PC $3.25/MF $2.25.

Patent application 502,139. DC Regulator Having Feedforward Control. Filed Aug. 30, 1974. P C$3,25/MF $2.25.

Patent application 504,225. Clock Setter. Filed Sept. 9, 1974. PC $3.25/MF $2.25.

Patent 3,830,552. Journal Bearings. Patented Aug. 20, 1974. Not available NTIS.

Patent 3,830,609. Molding Apparatus. Patented Aug. 20, 1974. Not available NTIS.

Patent 3,831,098. Pulse Stretcher for Narrow Pulses. Patented Aug. 20, 1974. Not available NTIS.

Patent 3,833,322. Apparatus for Forming Drive Belts. Patented Sept. 3, 1974. Not available NTIS.

Patent 3,833,857. Millimeter Wave Pumped Parametric Amplifier. Patented Sept. 3, 1974. Not available NTIS.

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U.S. ATOMIC ENERGY COMMISSION

Assistant General Counsel for Patents, Washington, D.C. 20545

Patent application 448,313. Method and Apparatus for Laser Welding. Filed Mar. 5, 1974. PC $3.25/MF $2.25.

Patent application 466,346. High Strength and High Toughness Steel. Filed May 2, 1974. PC $3.25/MF $2.25.

Patent 3,801,418. Transparent Anti-Static Device. Filed Mar. 16, 1972. Patented Apr. 2, 1974. Not available NTIS.

Patent 3,803,512. Hydrogen-Fluoride Chemical Laser Oscillator. Filed Sept. 29, 1972. Patented Apr. 9, 1974. Not available NTIS.

Patent 3,804,680. Method for Inducing Resistance to Embrittlement by Neutron Irradiation and Products Formed Thereby. Filed Aug. 8, 1972. Patented Apr. 16, 1974. Not available NTIS.

Patent 3,805,218. Battery Cable Assembly. Filed Apr. 4, 1973. Patented Apr. 16, 1974. Not available NTIS.

Patent 3,805,715. Method for Drying Sludge and Incinerating Odor Bodies. Filed Oct. 26, 1972. Patented Apr. 23, 1974. Not available NTIS.

Patent 3,806,749. Method and Means of Effecting Charge Exchange in Particle Beams. Filed Jan. 12, 1973. Patented Apr. 23, 1974. Not available NTIS.

Patent 3,810,963. Method of Preparing a Syntactic Carbon Foam. Filed Oct. 29, 1971. Patented May 14, 1974. Not available NTIS.

Patent 3,814,185. Method for Interconnecting Nuclear Chimneys. Filed Feb. 27, 1973. Patented June 4, 1974. Not available NTIS.

Patent 3,814,552. Personal Air Sampling Pump. Filed Apr. 17, 1973. Patented June 4, 1974. Not available NTIS.

Patent 3,815,038. Differential Amplifier Circuits. Filed Apr. 13, 1973. Patented June 4, 1974. Not available NTIS.

Patent 3,815,046. Synchronously Driven Q-Switched or Q-Switched-Mode-Locked Laser Oscillator. Filed Feb. 7, 1973. Patented June 4, 1974. Not available NTIS.

**Patent 3,815,224. Method of Manufacturing a Ductile Superconductive Material. Filed June 8, 1971. Patented June 11, 1974. Not available NTIS.**

**Patent 3,817,793. High Temperature Thermocouple Alloy Systems. Filed Nov. 19, 1968. Patented June 18, 1974. Not available NTIS.**

**Patent 3,818,375. Multisided Electron Beam Excited Electrically Pumped Gas Laser Systems. Filed Mar. 27, 1973. Patented June 18, 1974. Not available NTIS.**

**Patent 3,821,053. Thermocouple and Method of Making Same. Filed Sept. 20, 1972. Patented June 28, 1974. Not available NTIS.**

U.S. DEPARTMENG OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

**Patent 3,743,380. Polarized Light Source for Underwater Use. Filed Jan. 31, 1972. Patented July 3, 1973. Not available NTIS.**

**Patent 3,743,383. High Power Beam Combiner. Filed Mar. 23, 1972. Patented July 3, 1973. Not available NTIS.**

**Patent 3,743,835. Laser Image and Power Level Detector Having Thermographic Phosphor. Filed Mar. 23, 1972. Patented July 3, 1973. Not available NTIS.**

**Patent 3,775,734. Echo-Range Equalizer Sonar System. Filed May 5, 1971. Patented Nov. 27, 1973. Not available NTIS.**

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

**Patent application 511,334. Spatial Filter for Q-Switched Lasers. Filed Oct. 2, 1974. PC $3.25/MF $2.25.**

**Patent application 511,887. Atomic Standard With Variable Storage Volume. Filed Oct. 3, 1974. PC $3.25/MF $2.25.**

**Patent application 511,888. Double Discharge Metal Vapor Laser With Metal Halide as a Lasant. Filed Oct. 3, 1974. PC $3.25/MF $2.25.**

# PATENT EXAMINING CORPS

**WILLIAM FELDMAN, Acting Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF JANUARY 18, 1975

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 3-6-74 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—R. F. BURNETT, Acting Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 4-1-74 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 2-6-74 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. L. LEAVITT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 6-17-74 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. FRIEDMAN, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 2-14-74 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 6-12-74 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 7-10-73 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 1-2-74 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 6-17-74 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 12-20-73 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 9-10-73 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—G. M. FORLENZA, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 7-1-74 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 6-18-74 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. PULFREY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 7-1-74 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 5-23-74 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 7-1-74 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during **February 1975**, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved **August** 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,821,713 to 2,825,063, inclusive
Plant Patents..... Numbers 1,677 to 1,685, inclusive

# REISSUES

## FEBRUARY 11, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

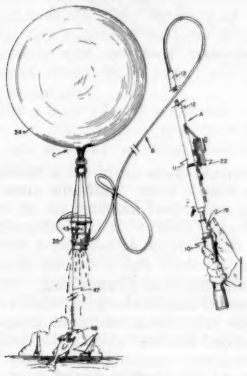
### 28,331

### FISHING APPARATUS

Gerald C. Nordeen, 1612 Victoria Park Road
Fort Lauderdale, Fla. 33305

Original No. 3,698,121, dated Oct. 17, 1972, Ser. No. 142,311, May 11, 1971. Application for reissue Oct. 17, 1973, Ser. No. 407,233

Int. Cl. A01k *93/00*
U.S. Cl. 43—43.14 3 Claims



1. A fishing apparatus comprising:
(a) a rod;
(b) a float, said float having means thereon extending downwardly therefrom and adapted to carry a fish lure and catching means thereon;
(c) means incorporated in the float for varying the weight thereof from a maximum wherein the float will rest upon the water, to a minimum wherein the float will become lighter than air and be lifted from the water;
(d) a line connecting the rod and the float; and
(e) means on the rod and operable through the line for changing the weight of the float.

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### 28,332

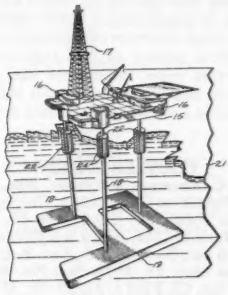
### METHOD AND APPARATUS FOR PREVENTING ICE DAMAGE TO MARINE STRUCTURES

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Original No. 3,669,052, dated June 13, 1972, Ser. No. 46,273, June 15, 1970. Application for reissue Oct. 25, 1973, Ser. No. 409,747

Int. Cl. B63b *35/08*
U.S. Cl. 114—.5 R 15 Claims

1. Apparatus for preventing ice damage comprising:
a structure fixedly positioned in water subject to moving ice floes;
means connected to the structure adjacent the water line for comminuting ice floe in a region between the advancing ice floe and the balance of the structure, said means for comminuting comprising means for applying high velocity impacts on local areas of the ice; and



means for traversing the means for comminuting about at least a portion of the structure adjacent the water line.

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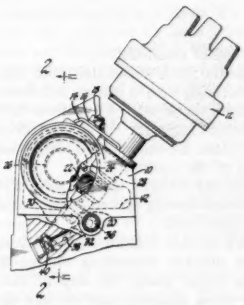
### 28,333

### DISTRIBUTOR DRIVE ARRANGEMENT

Harold M. Haskew, Milford and David A. Martens, Washington, Mich., assignors to General Motors Corporation, Detroit, Mich.

Original No. 3,662,726, dated May 16, 1972, Ser. No. 27,675, Apr. 13, 1970. Application for reissue May 14, 1973, Ser. No. 359,975

Int. Cl. F02p *7/00*
U.S. Cl. 123—146.5 A 2 Claims



1. A distributor drive arrangement for an internal combustion engine having a [cam] shaft journaled in the [cylinder head] *housing* of the engine provided with a gear thereon, and a distributor having a journaled drive shaft with a gear thereon extending from one end thereof and positioned on the [cylinder block] *housing* with the gear on the drive shaft in mesh with the gear on the [cam] shaft, said distributor drive arrangement including

bushing means in said [cylinder head] *housing* located concentric with said drive shaft, said bushing means having a partly closed end, said drive shaft having an extension shaft portion journaled in said bushing means, said extension shaft portion extending into said bushing to a position at which its free end is closely adjacent said partly closed end whereby said bushing means serves as a cylinder and said extension shaft portion serves as a piston therein, and passage means in said [cylinder head] *housing* in communication with said bushing means and adapted to be connected to a source of oil under pressure, said passage means opening into said bushing adjacent said partly closed end whereby said drive shaft is hydraulically loaded in one direction by oil under pressure acting on said free end of said extension shaft portion, the clearance between the inside diameter of said bushing means and the outer peripheral surface of said extension shaft portion being such that upon rotation of said extension shaft portion in said bushing means viscous shearing of oil will occur to provide a viscous drag on said drive shaft.

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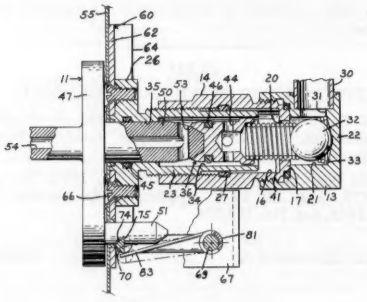
**28,334**
**COUPLER ASSEMBLY**
**Bidwell C. Cranage, Ferguson, Mo., assignor to Chemetron Corporation, Chicago, Ill.**
**Original No. 3,448,760, dated June 10, 1969, Ser. No. 556,173, June 8, 1966, which is a division of abandoned application Ser. No. 329,319, Dec. 9, 1963. Application for reissue Nov. 16, 1973, Ser. No. 416,713**
**Int. Cl. F16l** *5/02, 33/00, 37/08*
**U.S. Cl. 137—360** **2 Claims**




1. In a coupler assembly:
(a) a station for a designated fluid comprising a valve plug-receiving means having a forward head portion,
(b) a cover plate for the station having an opening communicating with the plug receiving means, the cover plate having a fluid designation conforming to that of the station,
(c) a bracket secured to one side of the cover plate, the bracket having spaced flanges extending from the cover plate, and
(d) a key or slot located in a predetermined position on the bracket depending on the fluid designation on the cover plate, the key or slot interfitting respectively a coacting slot or key located in a predetermined position on the head portion, the predetermined positions of the coacting key and slot being different for each fluid,
(1) the head portion being located between the flanges to align the plug-receiving means with the cover plate opening when the coacting key and slot of a compatible bracket and head portion for a particular designated fluid are interfitted, the interfitted key and slot assuring that the cover plate having the correct fluid designation will be mounted to the station for that designated fluid.

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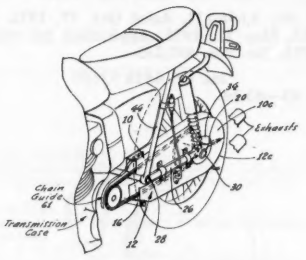
**28,335**
**MOTORCYCLE CHAIN GUARD**
**George R. Wood, 528½ E. Fairview Inglewood, Calif. 90302**
**Original No. 3,724,582, dated Apr. 3, 1973, Ser. No. 190,252, Oct. 18, 1971. Application for reissue Apr. 12, 1973, Ser. No. 350,511**
**Int. Cl. B62j** *13/04*
**U.S. Cl. 180—33 R** **8 Claims**




1. A motorcycle chain guard for a motorcycle including a frame with a lower midframe cross member, an engine and a rear wheel mounted on an axle extending between the rear ends of a pair of swing arms and driven by a chain extending between a first sprocket on the engine drive shaft and a second sprocket on said rear wheel, said chain guard comprising:
A. An upper U-shaped elongated shell extending from the motorcycle's lower midframe cross member to a point beyond the rear wheel chain sprocket and any chain tensioner extending rearwardly therefrom;
B. A lower U-shaped elongated shell of similar extent to that of the upper shell;
C. A plurality of bracket means, each said means being secured between one side of the said upper shell and a side of the said lower shell to secure said shells in opposed parallel spaced relationship to each other about the exposed portion of the motorcycle chain which extends rearward from the engine to the second sprocket, said bracket means adjacent the swinging arm being closely looped about said arm to provide some support for the two thus-secured shells therefrom;
D. The forward ends of said thus-secured shells resting upon a cross frame member for further support therefrom, and said shells being secured together at their trailing ends;
E. Said shells being configured along their adjacent edges axially opposite the rear wheel axle to provide a greater ventilating spacing about the sprocket;
F. An oil reservoir mounted beneath the motorcycle seat, said reservoir including a tube extending downwardly therefrom and controllable valve means to regulate the quantity of the oil which is passed from the reservoir into said tube;
G. One of said shells having a removable plate, said plate being orificed to pass therethrough the lower end of said tube and to dispose the same to drip oil upon the chain; and
H. The lower shell being orificed in its lowermost rear area to vent oil accumulated therein rearwardly therefrom.

28,336

## CARBON BLACK DISPERSIONS, THEIR PREPARATION AND FILM PRODUCTS THEREWITH

Harold R. Dalton, 931 Rydol Road
Jenkintown, Pa. 19046

Original No. 3,509,088, dated Apr. 28, 1970, Ser. No. 579,778, Sept. 15, 1966, which is a continuation-in-part of abandoned application Ser. No. 502,614, Oct. 22, 1965. Application for reissue Oct. 26, 1973, Ser. No. 409,883

Int. Cl. C08f *45/08;* H01b *1/04*
U.S. Cl. 252—511 16 Claims

1. The method of preparing the electric-signal-responsive film for a recording blank, which method comprises

(a) preparing a continuity-structure-providing suspension comprising carbon black particles dispersed in a film-forming multi-phase resin-complex comprising as its essential constituents a continuity-structure-providing film-forming resin effective for said signal-responsive film and a volatile organic solvent wherein the resin content of said complex is only partially dissolved thereby to provide in said multi-phase resin-complex from about 20 to about 80 percent of its resin content in particulate form as at least one member of the class consisting of (i) solid particles and (ii) *individual* particles swelled with imbibed solvent, said *individual* particles in the dry state free of solvent being from about 1 to about 50 microns in size; and

(b) applying a layer of said suspension over a surface whereon the desired signal-responsive film is to be formed, and allowing the volatile solvent content of said layer to evaporate off.

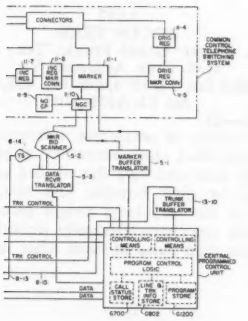
28,337

## TELEPHONE SWITCHING SYSTEM WITH PROGRAMMED AUXILIARY CONTROL FOR PROVIDING SPECIAL SERVICES

Fred J. Singer, Chatham, N.J., assignor to Northern Telecom Inc., Boston, Mass.

Original No. 3,555,196, dated Jan. 12, 1971, Ser. No. 669,436, Sept. 21, 1967. Application for reissue Feb. 22, 1974, Ser. No. 444,785

Int. Cl. H04q *3/54*
U.S. Cl. 179—18 ES 33 Claims




1. A telephone switching system comprising:

(a) transmission paths;

(b) first switching means for interconnecting the transmission paths;

(c) a common controlling means connected to the switching means for controlling the operation of the switching means; and

(d) programmed controlling means connected to *and acting in consort with* the common controlling means, for modifying the *sequence of* operation thereof in a program responsive manner, in response to a request by the common controlling means for such connection, upon recognition by the common controlling means of its inability to process a request for service from one of the transmission paths without such connection.

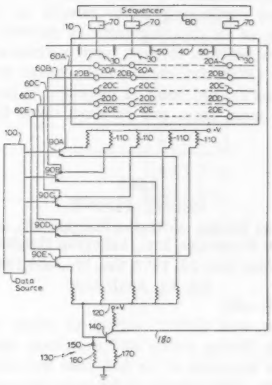
28,338

## CIRCUIT FOR OPERATING MULTIPLE POSITION DISPLAY TUBES

George E. Holz, North Plainfield, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Original No. 3,694,693, dated Sept. 26, 1972, Ser. No. 87,058, Nov. 5, 1970. Application for reissue Mar. 7, 1973, Ser. No. 338,887

Int. Cl. H05b *37/00*
U.S. Cl. 315—167 11 Claims




1. A circuit for operating a display tube comprising a gas-filled envelope containing a plurality of groups of electrodes arrayed in spaced-apart relationship, each group including a plurality of glow cathodes spaced apart in a plane and an associated anode positioned for electric discharge therewith, the cathodes in each group being so arrayed that they can be energized in different combinations to represent different characters and each group having cathodes which correspond in location to the cathodes of said other groups, and an auxiliary electrode common to all of said groups of electrodes and shielding said groups of electrodes from each other, said circuit comprising:

means for applying a first energizing potential to said anode electrodes from a source of operating potential,

a common cathode conductor interconnecting the corresponding cathode electrodes of the different groups of cathodes,

means for applying a second operating potential to each common cathode conductor, there being a current path from each anode through each cathode and the source of operating potential, and

a circuit module coupled to all of said current paths and to the common auxiliary electrode for receiving the total current flowing in each group of cathodes as each is energized, said circuit module including means for conducting a current proportional to said total current and coupling it to said common auxiliary electrode.

# PLANT PATENTS

## GRANTED FEBRUARY 11, 1975

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 3,682
### ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed July 23, 1973, Ser. No. 381,853
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—5 1 Claim

1. A new and distinct cultivar of rose plant of the climber class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its climbing habit of growth; abundant, large mildew resistant folliage, large quantities of blooms of Begonia (*Wilson's*) color which change to Porcelain Rose (*Wilson's*); and habit of blooming in large clusters on ends of main canes and on short stems from lateral growth.

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### 3,683
### PEONY PLANT

Carl George Klehm, Arlington Heights, Ill., assignor to Klehm Properties, Inc., Arlington Heights, Ill.

Filed Oct. 24, 1973, Ser. No. 409,174
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of peony plant substantially as herein shown and described, characterized by the very large size of its full, rose type, double blossoms and the silver edging of the pale pink coloration of the blossom petals.

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### 3,684
### PEONY PLANT

Carl George Klehm, Arlington Heights, Ill., assignor to Klehm Properties, Inc., Arlington Heights, Ill.

Filed Oct. 26, 1973, Ser. No. 410,209
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of peony plant substantially as herein shown and described, characterized by the bomb shape of its white flower, interspersed with an inner blush of yellow before maturity, the earliness of flowering, the long lasting quality as a cut flower, and the extra long length of its flowering stems.

### 3,685
### ROSE PLANT

Reimer Kordes, Sparrieshoop, near Elmshorn in Holstein, Germany, assignor to Jackson & Perkins Co., Medford, Oregon

Filed Nov. 9, 1973, Ser. No. 414,420
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—16 1 Claim

1. A new and distinct cultivar of rose plant of a class intermediate between floribunda class and hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combinations of its heavily branched and clustering plant habit; hybrid tea type and size of flowers; medium sized and dark leathery foliage; Burnt Orange color of bud and open flower.

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### 3,686
### GRAPEVINE

Fay E. Triplett, 749 E. Keyes Road
Ceres, Calif. 95307

Filed Jan. 2, 1974, Ser. No. 430,033
Int. Cl. A01h *5/03*
U.S. Cl. Plt.—47 1 Claim

1. A new and distinct table-wine variety of grapevine, substantially as illustrated and described, which is of medium vigor, upright, medium dense, hardy, foliated with medium size, thick, cordate leaves, and productive of medium size, long conical clusters of medium size, black, uniform, spherical, easy to harvest berries having a bluish bloom; the berries sugaring early and high while retaining high acid and low pH, and ripening early to mid-season in comparison to mid-season to late ripening of the Ruby Cabernet.

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### 3,687
### PECAN TREE

Micral K. Parker, Grand Prairie, Tex., assignor to O. S. Gray, Arlington, Va.

Filed Jan. 14, 1974, Ser. No. 433,120
Int. Cl. A01h *5/03*
U.S. Cl. Plt.—31 1 Claim

1. A new variety of pecan tree, substantially as herein shown and described, characterized by its prolific production of large sized and very thin shelled nuts which are distinguished by their box-like and blunt-ended body form, and by the very large weight percentage of the kernels which are characteristically smoother and freer from wrinkles than those of most other nut varieties.

# PATENTS

## GRANTED FEBRUARY 11, 1975

### ERRATA

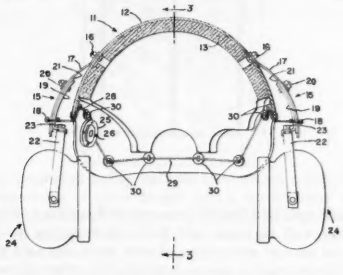
| For CLASS | See PATENT NO. |
|---|---|
| 404-098 | 3,864,858 |
| 073-143 | 3,864,953 |
| 102-064 | 3,865,027 |
| 102-070 | 3,865,028 |
| 123-196 | 3,865,213 |
| 215-321 | 3,865,263 |
| 225-096 | 3,865,288 |
| 321-013 | 3,865,438 |
| 423-032 | 3,865,580 |
| 029-191 | 3,865,584 |
| 156-264 | 3,865,681 |
| 250-432 | 3,865,734 |
| 352-044 | 3,865,738 |
| 240-049 | 3,865,790 |

# PATENTS

## GRANTED FEBRUARY 11, 1975

## GENERAL AND MECHANICAL

**3,864,756**
**ADJUSTABLE EARMUFFS**
**David N. Desimone, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Dec. 18, 1972, Ser. No. 315,967**
**Int. Cl. A42b** *3/00*
**U.S. Cl. 2—6** **2 Claims**



1. Headgear comprising, in combination;
a helmet;
a pair of ear covers formed to encompass the ears;
a pair of resilient support means mounted on said helmet each containing one of said ear covers for juxtapositioning said ear covers adjacent to respective ones of the ears; and
adjustment means for simultaneously pulling said ear covers toward the ears including take-up means operatively mounted on said helmet, guide means fixed to the inside of said helmet between said take-up means and said support means, and a pair of cords threaded through said guide means fixed at their respective one ends to said take-up means and extending laterally outward from said helmet, fixedly terminating at their respective other ends at respective ones of said support means.

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**3,864,757**
**BELT RETAINER**
**Edward G. Hartigan, Schaumburg, Ill., assignor to The Kendall Company, Walpole, Mass.**
**Filed Sept. 25, 1972, Ser. No. 292,022**
**Int. Cl. A41b** *9/00*
**U.S. Cl. 2—114** **10 Claims**

1. A retainer comprising, a belt; and a strip of flexible material having a first surface, a second surface, a pair of side edges, a pair of end edges connecting the side edges, a generally S-shaped cutout defining an upwardly extending tab and a depending finger intermediate said tab and one of said end edges, said tab and finger having first and second surfaces defined by the corresponding surfaces of said strip, with said finger having an edge facing toward the one end edge of said strip, and means along the finger edge for releasably engaging said belt, said belt passing over the first surface of said strip adjacent the other of said end edges, behind the second surface of said tab and finger, around the edge of the finger, and behind the second surface of the tab, with the engaging means retaining the belt at a selected position.

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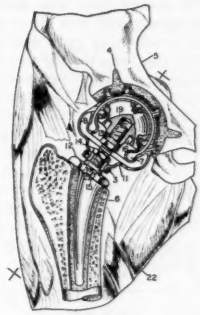
**3,864,758**
**HIP JOINT BEARING PROSTHESIS**
**Sam Savo Yakich, 1266 E. St. Clair, Idaho Falls, Idaho 83401**
**Filed Aug. 31, 1973, Ser. No. 393,569**
**Int. Cl. A61f** *1/24*
**U.S. Cl. 3—1** **1 Claim**



1. A joint prosthesis for use in a human bone joint such as the acetabulum or the like comprising, a one-piece hollow double wall spherical ball member defined by an inner wall hermetically sealed to an outer wall, said inner and outer walls being spaced from each other to form cavity therebetween which includes a lubricating fluid therein, said walls terminating in a lower terminal first annular skirt which is surrounded by a second elongated annular skirt, said second skirt adapted to to be attached to a portion of another prosthetic joint member to effect a seal therewith to prevent contact with body fluids and tissue, said hollow ball and annular skirts being fabricated from biomedically inert elastic material and being provided with means to attach the joint prosthesis to a human bone joint.

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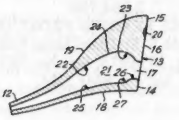
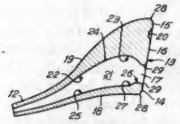
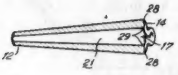
**3,864,759**
**ARTICLE TO BE USED BY HUMAN FEMALES WHEN URINATING**
**Akira Horiuchi, Tokyo, Japan, assignor to Yoshihide Fujimoto and Akigoshi Kurihara, both of Tokyo, Japan, part interest to each**
**Filed June 12, 1973, Ser. No. 369,275**
**Claims priority, application Japan, June 19, 1972, 47-60428**
**Int. Cl. E03d** *13/00*; **A61b** *19/00*
**U.S. Cl. 4—110** **17 Claims**

1. For use by human females when urinating, an elongated solid body having a relatively large inlet end and an opposed relatively small outlet end adapted to be connected with a tube, said solid body gradually diminishing in cross section from said inlet to said outlet end thereof and being formed with an elongated passage extending from said inlet to said outlet end of said body longitudinally therethrough, said inlet

end of said body terminating in a substantially flat end surface and being of an elongated generally oval configuration to be comfortably positioned at a location where the end of said passage at said inlet end will receive urine from the urethra, said solid body having a cross section which diminishes more sharply at an intermediate region of the body substantially midway between the opposed ends thereof than in the region of said opposed ends thereof, and said body being of a generally muttonchop configuration and having between its opposed ends a pair of opposed side edges which are of substantially S-shaped configuration with one of said side edges being curved to a substantially greater degree than the other, and said body having a substantially uniform wall thickness extending between said outlet end and said intermediate region of said body, and said body having between said intermediate region and said inlet end thereof at least along said side edge of greater curvature a thickness which is substantially greater than the thickness of said body from said intermediate region thereof to said outlet end thereof.







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**3,864,760**

**BATHING FACILITY**

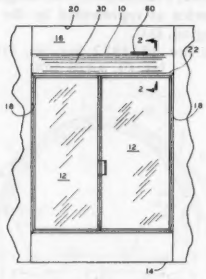
**Duane C. Bowen, 2290 Nob Hill Dr., Carlsbad, Calif. 92008**

**Filed Apr. 26, 1972, Ser. No. 247,795**

**Int. Cl. A47k** *3/22*

**U.S. Cl. 4—146** **15 Claims**

**1.** An improvement in the combination of a bathroom and a bathing facility positioned therein, said facility being fitted between first and second parallel vertical end wall surfaces and a third vertical side wall surface meeting said first and second wall surfaces at right angles and a horizontal ceiling wall surface above said facility, said wall surfaces above said bathing facility being finished, and there being a horizontally slidable closure on the side of the facility opposite to said third wall surface extending between said first and second wall surfaces and which can be opened for access to said facility, said closure being supported from a top horizontal rail extending between said first and second wall surfaces and spaced below said ceiling surface, said improvement being means to substantially prevent passage of heated and moist air between said rail and said ceiling surface from said bathing facility into said bathroom when said closure is extended between said first and second walls, said means comprising and elongated sheet-like body with two parallel elongated side edges and two parallel transverse edges substantially bridging the space between said rail, said first and second wall surfaces and one of said other wall surfaces, and first interengaging means between one of said side edges of said body and said rail and second interengaging means between the other of said side edges of said body and said one of said other surfaces to support said body above said facility, said transverse edges being adjacent said first and second walls respectively said one of said other surfaces being said third vertical wall surface.



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**3,864,761**

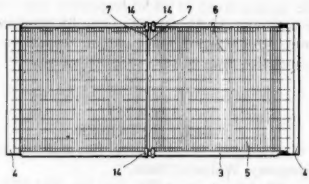
**WITHDRAWABLE COVER FOR A SWIMMING POOL**

**Eduard Stalder, Sfein Rain 249, 4113 Fluh, Switzerland**

**Filed Nov. 12, 1973, Ser. No. 414,692**

**Int. Cl. E04h** *3/16, 3/18*

**U.S. Cl. 4—172.14** **8 Claims**



**1.** A withdrawable cover for a swimming pool, comprising in combination:

a drum adapted to be rotatably mounted about an axis;

a first elongate member extending substantially parallel to said axis;

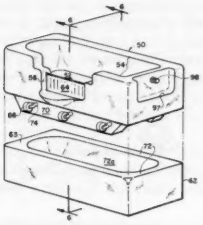
a plurality of mutually parallel and spaced apart cables each interconnecting said first elongate member and a peripheral portion of said drum;

a plurality of further elongate members each extending substantially parallel to the first elongate member and each overlying said cables, longitudinal edge portions of respective ones of said further elongate members being disposed in edge-to-edge relationship and being mutually intercoupled to permit said further elongate members to be rolled-up around the periphery of said drum, one of said further elongate members being disposed next adjacent said first elongate member and being connected thereto; whereby said further elongate members when unrolled from said drum may be supported along a major portion of their lengths by said cables to provide a cover extending over a swimming pool.

## 3,864,762
## ELEVATED SAFETY BATHTUB

Eve B. Finch, 5190 S.W. Chestnut St., Beaverton, Oreg. 97005

Filed Mar. 1, 1972, Ser. No. 230,639
Int. Cl. A47k *3/00, 3/024*
U.S. Cl. 4—173 9 Claims

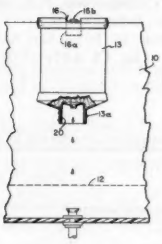


1. An improved safety bathtub comprising a tub having a floor supported at chair height and a surrounding wall for holding a quantity of water, said tub wall having an opening therein extending from the top of said wall downwardly toward said tub floor for permitting a person to seat himself on said tub floor through said opening preparatory to positioning himself wholly within said tub for bathing and a water-tight barrier associated with said opening for sealingly closing said opening after said person has positioned himself wholly within said tub, wherein the improvement comprises arm rest means formed in said tub wall adjacent to the sides of said opening at a height lower than the top of said wall for supporting the arms of said person seated on said tub floor and for use in entering and leaving said tub.

## 3,864,763
## DISPENSING CAP FOR DISCHARGING LIQUID INTO FLUSH TANK FROM A BOTTLE DURING A FLUSHING CYCLE

George B. Spransy, Oconomowoc, Wis., assignor to W. Braun Company, Chicago, Ill.

Filed Aug. 6, 1973, Ser. No. 385,791
Int. Cl. E03d *9/03*
U.S. Cl. 4—227 3 Claims

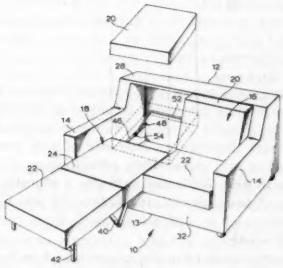


1. An integrally molded fitment for use with a bottle of predetermined volume containing a liquid whose characteristics make it desirable to introduce a small quantity into the flush tank of a toilet during a flushing cycle, said bottle having a neck in which is supported a fitment, said fitment being cup shaped and having a concave bottom cup wall provided with a centrally located nozzle structure extending inwardly of the cup, said nozzle structure containing a fine nozzle or passageway having a diameter of between about 0.010 inches and about 0.020 inches, and a length of about 1/16 inch to about ⅛ inch, depending upon the quantity of liquid to be discharged per cycle, a specific diameter dimension being maintained to a tolerance of less than 10% in production, said liquid in said bottle normally having a viscosity and surface tension of the same general order as that of water, said fitment having a well at each end of the passageway, the well at the liquid discharge end within said fitment being conical and having a suitable cone angle, the well at the liquid entrance end of the passageway having a flat bottom surrounding the end of said fine passageway, said fitment being adapted to be secured in an air-tight fit to said bottle and having the bottle and fitment inverted with the open ended cup chamber of the fitment extending downwardly from the bottle, said chamber defining a volume of the order of at least about one-two hundredths of the volume of the bottle interior, the water in the flush tank being adapted to cover the open end of said fitment chamber and rise therein and extend outside of said fitment above said open end for a distance of from about ⅛ inch to about 4 inches when said flush tank attains normal full condition in stand-by for a flushing operation, the water in said tank during flushing being adapted to drain from said tank so that the water level in said flush tank is below the bottom of said fitment with the open ended cup chamber being exposed to atmosphere, the fitment and bottle being adapted to cooperate with rising flush tank water level to force some air from said chamber through said fine passageway and into said bottle, said flush tank when water therein has drained so that the water level is below the level of said fitment permitting air in said bottle to expand and discharge a quantity of liquid from said bottle, the amount of said liquid discharged being dependent upon the dimensions of said passageway, the depth of immersion of said fitment in said tank water and the relative volumes of said fitment chamber and the bottle volume cooperating with the depth of immersion of said fitmentn below the surface of said water when said tank is in stand-by condition determining in part the amount of liquid discharged, the fitment dimensions and mounting being such that the tank water level within the fitment chamber is always below the nozzle structure.

## 3,864,764
## CONVERTIBLE FURNITURE

Mieczyslaw Januse, 848 Norwich Blvd., Bay Ridges, Ontario, Canada

Filed Nov. 5, 1973, Ser. No. 413,030
Int. Cl. A47c *17/14*
U.S. Cl. 5—29 5 Claims



1. An article of convertible furniture, convertible between tub positions, in one position providing a seating unit, and in the other position providing a reclining unit, said article having a back portion and a seat portion and comprising;

intermediate cushion means having an upholstered surface located in said seat portion with said upholstered surface directed downwardly;

pivot means connected to said intermediate cushion whereby the same may be rotated outwardly from said

seat portion, with said upholstered surface directed upwardly;

upper cushion means, having an upholstered surface located in said seat portion with said upholstered surface directed upwardly, super-adjacent said intermediate cushion means when in a seating position;

means pivotally connecting said intermediate cushion means and said upper cushion means whereby the same may be swung into alignment with one another into a reclining position;

support means for said upper cushion means supporting the same when swung into the reclining position as aforesaid; back cushion means having front and rear surfaces and located between said back portion and said upper cushion means, when said article is in its said seating position said back cushion being removeable;

main support frame means swingably mounted on said article between said back portion and said back cushion means and swingable outwardly for supporting said back cushion means in the reclining position, and,

secondary frame means swingably mounted on said main frame means for supporting said rear surface of back cushion means when the same is in the seating position.

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**3,864,765**

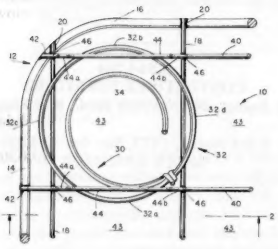
**BEDSPRING AND METHOD OF MAKING THE SAME**

**Irwin Anonauer, Oceanside, L. I., N.Y., assignor to Spring Associates, Inc., Brooklyn, N.Y.**

**Filed May 14, 1973, Ser. No. 359,988**

**Int. Cl. A47c *23/02***

**U.S. Cl. 5—266** **7 Claims**



**1.** A bedspring comprising a series of spaced elongate transversely extending members arranged substantially in a common plane; a series of spaced elongate longitudinally extending members disposed on one side of said plane and fixedly connected to said transversely extending members to form an intersecting grid-like array defining a plurality of spaces; at least one of said series of members being provided with indentations recessed in a direction away from the other of said series of members; a frame extending around said grid-like array, the free ends of said elongate members being connected to said frame and being supported by the latter; a plurality of coil springs each having a coil turn at one end thereof positioned coextensively with a space of said grid-like array of members, each end coil turn having dimensions greater than the spacing between adjacent longitudinal members and being interposed between one pair of transversely extending members and one pair of longitudinally extending members to position opposite peripheral portions of each end coil turn within respective indentations, whereby each coil spring is fixed in position in said grid-like array and is prevented from separating from the bedspring members.

**3,864,766**

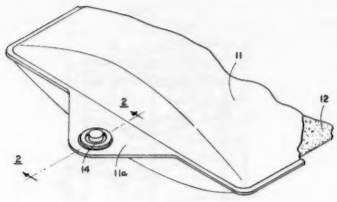
**SELF-ADJUSTING CONTOUR PILLOW**

**Ernest Prete, Jr., Woodland Hills, Calif., assignor to Ancra Corporation, El Segundo, Calif.**

**Filed Oct. 1, 1973, Ser. No. 402,197**

**Int. Cl. A47c *27/08***

**U.S. Cl. 5—337** **3 Claims**



**1.** A self-adjusting contour pillow comprising:

a flexible envelope fabricated of material substantially impervious to air;

said envelope including a flap portion extending outwardly from the edge thereof;

a manually operable air valve member for controlling the flow of air between the interior of said envelope and the ambient atmosphere;

said flap portion having an aperture formed therein, said aperture having sealing means running around the perimeter thereof for removably receiving said valve member in an air sealed relationship therewith; and

resilient filler means contained within and substantially filling said envelope, said filler means being highly permeable to air;

whereby when said air valve member is opened while said pillow is simultaneously being compressed in response to a body portion having a particular contour, the pillow retains said contour when the valve member is closed:

said air valve member comprises a body portion having an annular groove formed therein, said sealing means comprising an annular grommet fixedly attached to the perimeter of said flap portion aperture, said body portion being fitted in said aperture with said grommet matingly engaging the groove.

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**3,864,767**

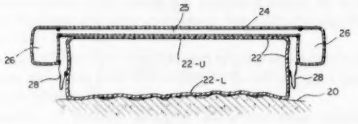
**AIR MATTRESS SUPPORT SYSTEM**

**Larry D. Adams, Collingswood, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.**

**Filed Feb. 26, 1973, Ser. No. 336,028**

**Int. Cl. A47c *27/08***

**U.S. Cl. 5—348 R** **3 Claims**



**1.** Support apparatus adapted for supporting a given load upon an irregular surface above the highest irregularity of said surface, comprising:

a. a support bag inflated with air to a first pressure, having a first depth;

b. an air cushion loosely positioned on top of said support bag and inflated with air to a second pressure less than said first pressure;

c. said respective pressures being such that when said load is positioned upon said air cushion, said support bag

maintains an air space between said air cushion and the highest irregularity of said irregular surface, and said air cushion maintains an air space between said load and said support bag, said support bag and said air cushion in mutual cooperative combination thereby providing a unitary well stabilized, relatively shock-insensitive suspension system for said load;

d. said second pressure being less than one atmosphere.

e. said air cushion having a pancake-like center portion having a second depth substantially less than said first depth for supporting said load and an outer bumper portion such that said air cushion is restrained from gross lateral displacement relative to said support bag, said bumper portion adapted to act as a reservoir to receive air from said center portion when a load is placed upon said center portion;

f. said support bag being made of a first material having a first thickness and said air cushion being made of a second material of a second thickness less than said first thickness;

g. a lubricant positioned between said support bag and said air cushion;

h. wherein said outer bumper portion of said air cushion has a form complementary to said support bag, and overhangs around said support bag, and

i. straps being connected loosely to said support bag and said air cushion, to insure the non-separation of said support bag and said air cushion.

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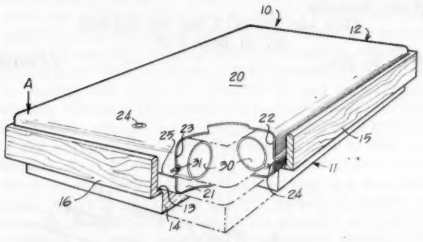
**3,864,768**

## WATER MATTRESS WITH INTERNAL FLOAT TUBE

**Richard Fraige, 1823 Alameda Ave., and Jerry Read, both of Alameda, Calif., assignors to Said Fraige by said Read**

**Filed July 13, 1973, Ser. No. 379,067**
**Int. Cl. A47c** *27/08*
**U.S. Cl. 5—348 WB** **10 Claims**




**1.** An improved water mattress with edge support which is adapted to be confined in a rigid box-like waterbed frame comprising:

a water inflatable bag-like enclosure having a top panel, a parallel, spaced-apart bottom panel and edge panels sealingly interconnecting said top and bottom panels to form a water-tight enclosure;

a water filling and valve means in one of said panels having fluid communication with the interior of said bag-like enclosure;

at least one float tube means hingedly connected at one edge internally within said enclosure adjacent to and along one edge panel thereof in a manner allowing it to move between said top and bottom panels independently of said one edge panel, said float tube means forming an internal, fluid-tight chamber within said bag-like enclosure; and

an air filling and valve means located in one of said panels and having fluid communication with said fluid-tight internal chamber whereby said float tube means can be pneumatically inflated to provide edge support for said top panel along the top of said one edge panel through its buoyancy in relation to the fluid filling said bag-like enclosure.

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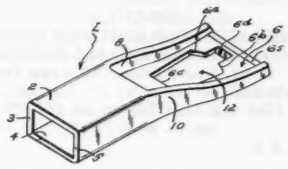
**3,864,769**

## MEANS FOR MOVING A SKI BOOT BUCKLE INTO AND OUT OF A CLOSED POSITION

**Munroe H. Hamilton, 66 Robbins Rd., Lexington, Mass. 02173**

**Continuation-in-part of Ser. No. 138,477, April 29, 1971, abandoned. This application Feb. 12, 1973, Ser. No. 331,690**
**Int. Cl. B25f** *1/00*
**U.S. Cl. 7—17** **6 Claims**




**1.** Ski boot buckle operating means for manually positioning a ski boot buckle prong, said buckle operating means comprising a lever body having spaced apart gripper sides formed at one end thereof for engaging an extremity of said buckle prong, a lever arm portion extending outwardly from one of the gripper sides to constitute a handle part through which manually applied pressure may be exerted to move the buckle prong, and reinforcing means formed at the junction of the lever arm and an adjacent gripper side to resist flexing when the manually applied pressure is transmitted through the gripper sides to move the buckle prong, said gripper sides being connected at their outer edges by side walls to form a tubular enclosure and the gripper sides being further joined throughout a portion of their length by inner wall portions parallel with and occurring in spaced relation to the said side walls.

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**3,864,770**

## BOAT HULL CONSTRUCTION

**Robert G. Zeilinger, 123L Sebring Dr., Depew, N.Y. 14043**

**Filed Oct. 31, 1973, Ser. No. 411,284**
**Int. Cl. B63b** *3/00*
**U.S. Cl. 9—6** **4 Claims**

**1.** In a boat construction having a rear cockpit bounded in part by hull side walls and a transversely extending rear wall, said hull side walls having forward and rearward outer surface portions, said rearward outer surface portions being characterized as being essentially vertically disposed, the improvement of a ladder associated with at least one of said rearward outer surface portions for assisting a swimmer in climbing from the water directly into said cockpit, which comprises in combination:

at least one slot recess formed in said one of said rearward outer surface portions and arranged below the water line of said boat when at rest in the water, said recess being horizontally elongated and having lower tread, upper and rear surfaces, said recess having a forwardly disposed end thereof characterized as being of progressively reduced cross-sectional area in a direction towards one of said forward outer surface portions associated with said one

rearward outer surface portion for affording smooth water flow transition therebetween, said recess having a rearwardly disposed end thereof opening through an outer surface of said rear wall for allowing unobstructed flow of water rearwardly through said recess, and said recess is characterized as having a generally rectangular cross-sectional configuration and as being dimensioned to at least receive the fingers/toes of a swimmer and as extending forwardly of said rear wall through a distance at least approximating shoulder width of said swimmer in order to facilitate entry of said swimmer directly into said cockpit.

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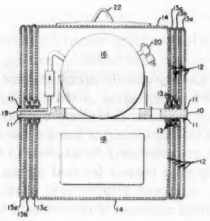
**3,864,771**

## DEPLOYABLE LOAD BUOYANCY SUPPORT CONTAINER OR SHELTER SYSTEM

**William H. Bauer, Grand Island, N.Y., and Textron Inc., Providence, R.I.**

**Filed Aug. 21, 1972, Ser. No. 282,370**
**Int. Cl. B63b *21/52***
**U.S. Cl. 9—8 R** **12 Claims**



1. A buoy transportable in compacted small volume form and adapted to be subsequently extended into large volume condition, said sonobuoy comprising:

a base member of ring-like form subtended at opposite sides thereof by wall members, each said wall members being formed of a plurality of internested ductile sheet material cylindrically shaped straight wall components of different diameters disposed concentrically about a common extension axis and interconnected by annular fold components and having an end closure component functionally integral therewith at opposite ends thereof,

said straight wall components and said annular fold components being formed of the same material and being of substantially equal wall thickness throughout; and either the largest or smallest diameter wall component of said plurality being affixed to said base member;

and means for causing said sonobuoy to unroll in the direction of said extension axis and to extend into a single generally cylindrical configuration closed at all side wall and end portions thereof.

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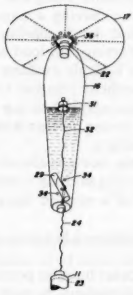
**3,864,772**

## DEPTH CONTROL

**Roland M. Gogolick, Arlington; Richard L. Brown, Lexington, both of Mass., and William J. Finney, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 26, 1947, Ser. No. 788,106**
**Int. Cl. B63b *45/08*, *45/00***
**U.S. Cl. 9—8 R** **6 Claims**

1. Apparatus for maintaining an underwater device at a substantially predetermined depth in water, comprising; gas release means including a valve body, a valve seat movable relative to the valve body, a balloon attached to the valve body and to said device, an umbrella attached to the valve seat adapted to move same relative to the valve body in accordance with velocity of the apparatus in a generally vertical direction, means for generating gas within the balloon, said gas release means communicating with the inside of the balloon, a valve cooperating with the valve seat, hydrostatic pressure responsive means for moving said valve relative to



the valve body and valve seat in accordance with hydrostatic pressure, the construction and arrangement being such that the amount of gas released from the balloon by the gas release means is a function of said velocity and pressure.

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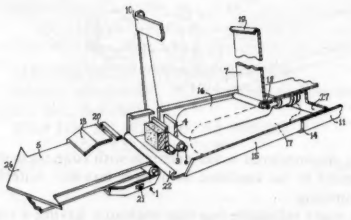
**3,864,773**

## INFLATABLE WATER-RESISTANT LIFE-SAVING APPARATUS

**Neil Driscoll Geary, 73 Northcote Ave., Swansea, New South Wales, Australia**

**Filed Apr. 20, 1973, Ser. No. 352,918**
**Int. Cl. B63c *9/16***
**U.S. Cl. 9—316** **4 Claims**



1. A fastening mechanism to attach a gas inflatable belt about a wearer's body, comprising

a. a locking means for securing said belt under tension about the wearer,

b. a housing for gas containers,

c. a puncturing means to puncture said gas containers and inflate the belt,

d. actuating means to actuate the puncturing means,

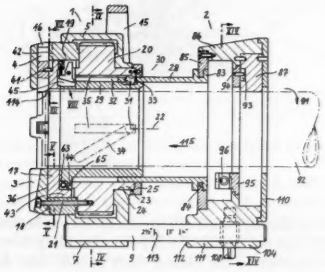
e. a wearer operable lever including said actuating means to actuate said puncturing means to puncture said gas containers and inflate said belt, with said lever simultaneously releasing said locking means so that the belt is unfastened about the body of the wearer and free to float up under the wearer's arms during inflation of the belt.

3,864,774

## THREAD CUTTING DEVICE

Arthur Fohl, Haubersbronn, Germany, assignor to Remswerk Christian Foll & Sohne, Waiblingen, Germany

Filed Mar. 5, 1973, Ser. No. 338,408
Claims priority, application Germany, Mar. 6, 1972, 2210668
Int. Cl. B23g 5/12, 11/00
U.S. Cl. 10—120.5 15 Claims



1. In a device for cutting male threads on a workpiece, especially conical threads such as pipe threads; a chuck housing adapted for receiving a workpiece from one side and having chuck means therein operable to grip a workpiece on the axis of the housing, a cutter housing on the other side of the chuck housing coaxial therewith and non-rotatably connected to the chuck housing but moveable axially relative thereto, a cutting jaw carrier rotatable in said cutter housing and including means for guiding thread cutters radially relative to the common axis of said housings, a control disc in said cutter housing rotatable relative to said carrier and including means for engaging cutters in said carrier and for actuating the cutters in the radial direction, a drive connected to said carrier for driving the carrier in rotation in said cutter housing whereby cutters in said carrier will cuttingly engage the end of a workpiece gripped in said chuck and cause axial movement of the workpiece and chuck housing relative to said cutter housing, drive means connected to said control disc and said chuck housing for rotating said control disc in a direction to cause cutters in said carrier to move radially outwardly, said drive means including a first sleeve element rotatably but nonaxially moveable connected to said chuck housing, a second sleeve element having one end telescoping one end of said first sleeve element, connecting means connecting the other end of said second sleeve element to said control disc, ball means captive in said one end of said first sleeve element, longitudinal guide means nonrotatable relative to said carrier engaging one radial side of said ball means, and helical groove means in said one of said second sleeve element engaging the other radial side of said ball means.

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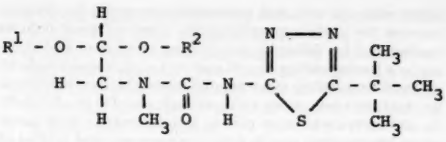
3,864,775

## DIALKYL ACETALS OF HETEROCYCLIC UREIDOACETALDEHYDE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 208,944, Dec. 16, 1971, Pat. No. 3,787,432. This application May 21, 1973, Ser. No. 362,033
Int. Cl. A01n 9/12
U.S. Cl. 71—90 5 Claims

1. A herbicidal composition comprising an inert carrier and as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein $R^1$ and $R^2$ are each alkyl of up to 3 carbon atoms.

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3,864,776

## PRESTRESSED POST TENSION SUSPENSION BRIDGE CABLE ANCHORAGE

Alfred Hedefine, Sparta, N.J., and Louis G. Silano, Seaford, N.Y., assignors to Parson, Brinckerhoff, Quade & Douglas, Inc., New York, N.Y.

Filed Nov. 15, 1973, Ser. No. 416,092
Int. Cl. E01d 11/00
U.S. Cl. 14—21 34 Claims

1. In a suspension bridge a cable anchorage construction comprising an anchorage mass, a cable, said cable including at least one cable strand, a bearing plate apposed to said cable, at least one rod opening in said bearing plate, at least one rod, said at least one rod gripped at least at one of its ends remote from said bearing plate, the other end of said at least one rod extending through at least one bearing plate opening, means to fasten said at least one extending rod held bearing upon said bearing plate, means bearing upon said bearing plate to hold said at least one said cable strand, tightening means including said bearing plate and said at least one rod to stress said cable anchor mass, means clear of said at least one rod held bearing upon said bearing plate to retain at least one cable strand, and means to tension said at least one cable strand against said anchorage mass's stress.

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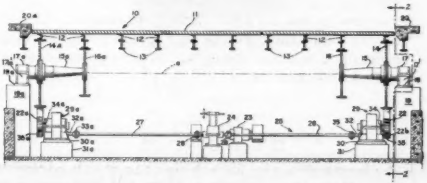
3,864,777

## BRIDGE-OPERATING MACHINERY

George Perkons, and Orrell B. Schailey, both of Philadelphia, Pa., assignors to The Earle Gear and Machine Company, Philadelphia, Pa.

Filed Apr. 29, 1974, Ser. No. 465,099
Int. Cl. E01d 15/08
U.S. Cl. 14—38 19 Claims



18. In a bascule bridge construction, a pair of trunnions, a bascule span including spaced main girder means each pivotally supported upon a corresponding one of said pair of trunnions, to accommodate swinging movements of said span about an axis defined by said trunnions, a pair of arcuately curved racks, each secured to a corresponding one of said main girder means with its center of curvature on said axis, and heavy-duty gear-drive means for driving said racks to swing said span and provide for opening and closing of the latter, said gear-drive means comprising: motor means; shafting coupled to said motor means, extending in general paral-

lelism with said axis, and substantially spanning the distance between the girder-supported racks; a pair of speed-reducer mechanisms for delivering power from portions of said shafting to a corresponding one of said racks, each speed-reducer mechanism including three parallel shafts, disposed in triangular array, and comprising an input shaft coupled to said shafting and carrying an input pinion, an intermediate shaft carrying an intermediate gear in driven engagement with said input pinion and carrying a second pinion, and an output shaft carrying an output pinion and having a gear in driven engagement with said intermediate pinion, the output pinion of each speed-reducer mechanism being in driving engagement with one of said racks; and means mounting each such speed-reducer mechanism as a single unitary assembly and protecting the same from corrosion, dirt and the like, said last means comprising rigid housing structure including parallel, spaced, walls each having three bearing-carrying openings disposed in triangular array corresponding to the shaft array, and confronting similar openings in the other wall, one set of corresponding and confronting openings, and the bearings thereof, serving to journal said input shaft with its pinion enclosed within said housing structure, another set of corresponding and confronting openings, and the bearings thereof, serving to journal said intermediate shaft with its gear and its pinion enclosed within said housing structure, and a third set of corresponding and confronting openings, and the bearings thereof, serving to journal said output shaft with its driven gear enclosed within said housing structure and its rack-driving pinion mounted exteriorly of said housing structure upon a free end portion of said output shaft which extends through one of the confronting openings of said third set.

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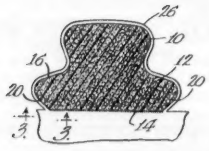
**3,864,778**

## CHALK ERASER MADE FROM CLOSED CELL FOAM PLASTIC

**Frank E. Vopat, 809 Woodcliff Dr., South Bend, Ind. 46615, and Stephen L. Colucci, 1203 Hillcrest Rd., South Bend, Ind. 46617**

**Filed Aug. 18, 1972, Ser. No. 281,714**
**Int. Cl. B43l** *21/00*
**U.S. Cl. 15—105** **5 Claims**



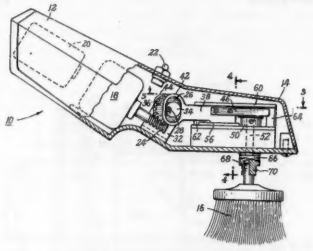

1. An improved eraser for erasing chalkboards comprising an eraser body having a substantially flat and continuous erasing surface, said eraser being composed of substantially rigid expanded, closed cell, non-porous thermoplastic foam material, a longitudinal recess in each side of said body to protect the fingers of a user, said body including a section in the form of an integral handle, said handle having a fused plastic skin on at least a major portion thereof, opposite edges of said erasing surface being beveled, and said material on said erasing surface being abraided and feathered and exposing open cells in said surface contiguous with said closed cell body, whereby the open cells collect chalk dust without penetration of said dust into the body of the eraser.

**3,864,779**

## OSCILLATING BRUSH

**Alfred R. Thomas, 309 Lafayette Ave., Brooklyn, N.Y. 11238**

**Filed June 28, 1973, Ser. No. 374,313**
**Int. Cl. A46b** *13/02*
**U.S. Cl. 15—22 R** **1 Claim**



1. An oscillating brush device comprising a housing, a pinion shaft mounted in said housing and extending therethrough, a brush secured to the pinion shaft outside said housing, a pinion mounted on the shaft within the housing, a pair of racks engaging said pinion respectively on opposing sides thereof, a motor mounted in said housing and having a rotary drive shaft, a worm screw in driven connection with said shaft, a worm wheel engaging said worm screw, a cam mounted on each face of said worm wheel in opposite phase, each of said racks being operatively connected to one of said cams whereby oscillatory motion is imparted to said brush upon rotation of said shaft.

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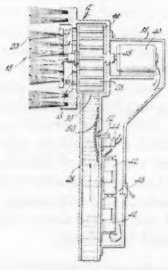
**3,864,780**

## CLEANING BRUSH WITH REVOLVING BRISTLES

**Jasper Watkins, P.O. Box 94, Clifton, N.J. 07015**

**Filed Dec. 26, 1973, Ser. No. 427,810**
**Int. Cl. A46b** *13/06*
**U.S. Cl. 15—29** **13 Claims**

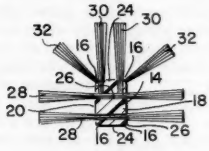


1. A brush comprising
a housing;
a bristle-bearing head rotatably mounted in said housing;
driven means connected to said head for rotating said head in response to fluid flow;
motor means connected to said head for rotating said head; and
fluid responsive control means for energizing said motor means as a function of fluid flow.

## 3,864,781
## DEVICE FOR BRUSHING DENTURES

Joseph A. Leonard, Los Osos, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 26, 1973, Ser. No. 373,649
Int. Cl. A46b 9/02, 9/04
U.S. Cl. 15—106 1 Claim




1. A device adapted to be manually operated to clean dentures by brushing, said device comprising:

an elongated handle with a head at one end, said head in cross section defining a rectangle with rounded corners and thus having four flat surfaces extending in the direction of elongation, oppositely disposed surfaces being parallel whereby two pairs of paralleled surfaces extend at right angles to each other, each two adjacent surfaces being interconnected by a rounded edge extending in the direction of elongation;

first bristle means secured to a first head surface and including first and second parallel rows of bristles extending in the direction of elongation and extending outward at right angles to the first head surface;

second bristle means secured to a second head surface parallel to the first head surface and oppositely disposed thereto, said second means including first and second parallel rows of bristles extending in the direction of elongation and extending outward at right angles to the second surface whereby the first and second means extend outward in opposite directions;

third bristle means secured to a third head surface which extends between the first and second surfaces at right angles, said third means including first and second parallel rows of bristles extending in the direction of elongation and extending outward at right angles to the third surface, said third means extending at right angles to the first and second means; and

fourth and fifth bristle means, each of the fourth and fifth bristle means including a single row of bristles extending in the direction of elongation and being secured to a corresponding one of the edges between the first, second and third surfaces, each of the fourth and fifth means extending outward at right angles to the corresponding edge and not intersecting with any other means.

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## 3,864,782
## COLLAPSIBLE MOP FRAME IMPROVEMENT

Harry T. Carter, Chanute, Kans., assignor to Fibrac, Inc., Chanute, Kans.

Filed Aug. 10, 1973, Ser. No. 387,467
Int. Cl. A47l 13/253
U.S. Cl. 15—147 A 2 Claims

1. A collapsible mop frame, comprising

opposed first and second wing sections,

each said wing section of U-shaped configuration with an outboard closed arcuate portion and substantially parallel inboard legs, the first wing being of spring wire stock,

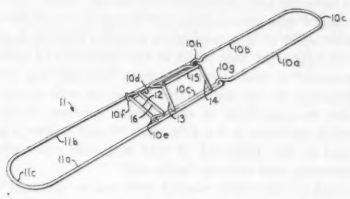
a transverse hinge bar connecting the legs of the second wing section intermediate the end thereof,

the inboard ends of the first section wrapped around the said transverse bar to form a hinge connection, whereby to allow hinged arcuate movement of the wing sections relative to one another,

the inboard ends of the first wing section lying inside of the inboard ends of the second wing section,

the inboard ends of the second wing section inwardly turned and limited portions of the first wing section legs arcuately configured intermediate the ends thereof whereby the former may underlie the latter when the sections are in plane with one another,

leg portions of the first wing section resiliently engagable and disengagable with the inwardly turned inboard ends of the second wing section by compression and release of the first section legs intermediate the ends thereof toward and away from one another,




transverse bar means interconnecting the second section legs between their inboard inturned ends and the hinge bar whereby to rigidly position said legs with respect to one another,

transverse bar means interconnecting the first section legs closely adjacent their inboard ends whereby to rigidly fix the first section legs with respect to one another next to the hinge, and

means connected to said second wing section inboard of the hinge bar operative to receive attachment of a mop handle.

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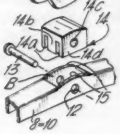
## 3,864,783
## METAL ARTICULATED SUPPORTS FOR WIPER BLADES OF WINDSHIELD WIPERS ON MOTOR VEHICLES

Dario Arman, 15 Piazza Adriano, Turin, Italy

Filed May 10, 1973, Ser. No. 359,148
Claims priority, application Italy, May 13, 1972, 68510/72
Int. Cl. B60s 1/04, 1/40
U.S. Cl. 15—250.42 2 Claims




1. A windshield wiper assembly comprising:

a. a principal bar articulated at its midpoint to a connector element for connection to the end of an oscillating arm of a motor vehicle,

b. a pair of rocker arms each articulated at its midpoint to an end of said principal bar,

c. each of said bar and rocker arms having a U-shaped cross-section defining parallel side walls and a connector wall between them, each said connector wall having an opening at its midpoint between the ends of its respective bar or rocker arm,

d. said connector element and each end of said bar having a U-shaped cross-section defining parallel side walls, the side walls of said connector element being spaced apart a distance greater than the width of the midpoint of said

bar and the side walls at each end of said bar being spaced apart a distance greater than the width of the midpoint of its respective rocker arm,

e. aligned holes in the side walls of said connector element and the side walls at the midpoint of said bar and a pivot pin extending through all said holes, and aligned holes in the side walls of each end of said bar and in the side walls of each rocker arm at its midpoint and a pivot pin extending through aligned holes at each end of said bar, and

f. three molded plastic spacer elements each having substantially the shape of a regular hexahedron, each spacer element having two parallel slots extending into the body of the element from one face of the spacer element and a through hole perpendicular to said slots,

g. one of said spacer elements being arranged between the side walls of said connector element with its slots accommodating the side walls at the midpoint of said bar, the portion of said spacer element between the slots fitting through the opening in the connector wall of said bar, and the through hole in said spacer element being aligned with the holes in the side walls of said connector element and at the midpoint of said bar, said pivot pin passing through said through hole, and

h. each of the other two of said spacer element being arranged between the side walls at each end of said bar with its slots accommodating the side walls at the midpoint of each rocker arm, the portion of said spacer element between the slots fitting through the opening in the connector wall of its respective rocker arm, and the through hole in said spacer element being aligned with the holes in the side walls of the respective end of said bar and at the midpoint of its respective rocker arm, the respective pivot pin passing through said hole.

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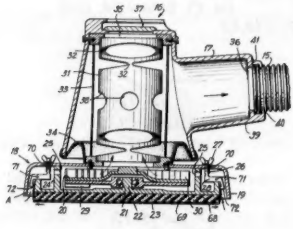
**3,864,784**

## SURFACE TREATING ATTACHMENT DEVICE

**Lars Gunnar Kilstrom, Taby, and Goran Arvid Henning Ridderstrom, Stockholm, both of Sweden, assignors to Akteibolaget Electrolux, Stockholm, Sweden**

**Filed Mar. 5, 1973, Ser. No. 338,370**
**Int. Cl. A47l** *5/30, 9/24*
**U.S. Cl. 15—380** **15 Claims**



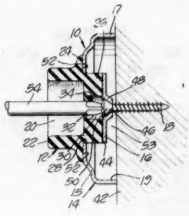
1. A surface treating attachment device adapted to be connected to a source of at least a partial vacuum comprising: an air flow channel extending from a location adjacent to the surface to be treated to said vacuum source, a rotatable fan wheel in said air flow channel, a handle-shaped part, said fan wheel having a weight placed outside the axis of rotation thereof whereby movement of the fan wheel by the air striking the vanes of the fan wheel generates an oscillating motion, a surface engaging working member operatively connected to said fan wheel whereby the oscillating motion generated by the fan wheel is transmitted to the working member which in turn oscillates in a plane that is generally parallel to the work surface, and energy absorbing means for operatively connecting said handle-shaped part to said working member which absorbs the movement of the working member in two directions that are generally perpendicular to each other.

**3,864,785**

## DOORSTOP

**William E. Hoppock, Whittier, Calif., assignor to Builders Brass Works, Los Angeles, Calif.**

**Filed Feb. 5, 1973, Ser. No. 329,812**
**Int. Cl. F16f** *1/36*
**U.S. Cl. 16—86 A** **5 Claims**



1. A doorstop of the type generally mounted on a wall comprising a rigid base member having a front wall portion and aperture therethrough, a resilient bumper having a base portion and an annular flange portion extending radially therefrom, said base portion extending through said aperture, said flange portion abutting said front wall portion of said base member and said base portion being disposed at a distance from the wall to which said doorstop is to be secured upon said base member being placed against said wall, a support plate secured to said base portion of said resilient bumper, said support plate having an aperture therethrough, means for securing said support plate to the base portion of said bumper and a fastening means adapted to extend through said aperture in said support plate and into said wall to extend said base portion of said bumper until said support plate abuts said wall, thereby securing said stop to said wall.

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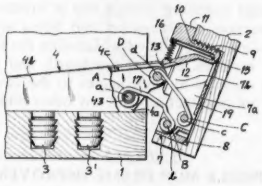
**3,864,786**

## SELF-CLOSING PIVOTAL JOINT WITH CONCEALED HINGE

**Luciano Salice, Via del Ronco, Carimate, Italy**

**Filed May 23, 1973, Ser. No. 363,117**
**Claims priority, application Italy, May 24, 1972, 24777/72**
**Int. Cl. E05d** *3/06*
**U.S. Cl. 16—163** **14 Claims**



1. A pivotal joint for two relatively swingable components, comprising:

a first member adapted to be secured to one of said components;

a second member adapted to be secured to the other of said components, said first member being provided with a channel open toward said second member, said second member having an extension received in said channel in one limiting position of said members;

an articulated linkage interconnecting said members, said linkage including a first pair of parallel pintles on said first member disposed in said channel, a second pair of parallel pintles on said second member and two hinge straps each anchored to a respective pintle of each pair, one

pintle of said second pair being mounted on said extension;

a resilient tongue on said first member extending from within said channel toward said second member and having a free end outside said channel disposed to engage said one pintle in an intermediate position remote from said one limiting position upon relative swinging of said members toward said one limiting position for exerting upon said second member a camming force tending to complete the swing, said tongue becoming disengaged from said one pintle upon a partial swinging of said members toward an opposite limiting position, said tongue extending generally tangentially of said one pintle in said intermediate position; and

an elastically compressible insert wedged in between said tongue and a wall portion of said first member bounding said channel, said insert bearing upon said free end in a sense resisting deflection of said tongue by said one pintle upon initial engagement thereof by said free end.

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**3,864,787**

## DEVICE FOR MODELLING POULTRY (PART 1)

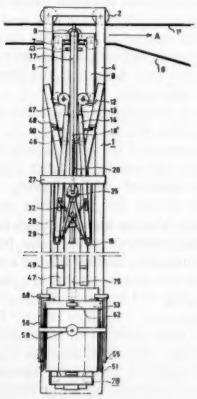
**Jacob Hendrik Mosterd, En Merkenbureau De Wit n.v. 11, Surinamestraat, Barneveld, Netherlands**

**Filed Sept. 11, 1972, Ser. No. 287,790**

**Claims priority, application Netherlands, Sept. 10, 1971, 71.12520**

**Int. Cl. A22c** *21/00*

**U.S. Cl. 17—11** **17 Claims**



**1.** In poultry packing apparatus having movable suspension means for suspending a fowl by its legs, a device supported generally in longitudinal alignment with said movable suspension means for folding the wings of poultry against the body, comprising a first member having a concave internal surface that in each part contains a straight line portion, hinge connections at the two ends of said first member, the pivot axes of said hinge connections being mutually parallel and said straight line portions being parallel to said pivot axes, two further members, one each pivotally connected to one of said hinge connections, said further members having concave internal surfaces that in each part contain a straight line portion parallel to said pivot axes, means for controlled pivoting of the said further members with respect to said first member from a first position, in which said first member and further members constitute an open shell, into a second position, in which said first and further members constitute a tube, and means for moving said suspension means toward and away from said first and further members so as to move a suspended fowl into the space encompassed by said first and further members.

**3,864,788**

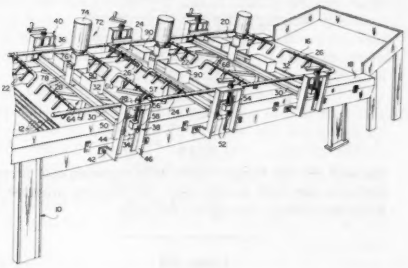
## SCALLOP SPREADING MACHINE

**Elmer D. Willis, Williston, N.C., assignor to Willis Brothers, Inc., Williston, N.C.**

**Filed Nov. 19, 1973, Ser. No. 417,125**

**Int. Cl. A22c** *29/00*

**U.S. Cl. 17—53** **9 Claims**



**1.** A scallop spreading machine for use with a scallop eviscerator formed by a plurality of counter-rotating rollers rotatably mounted on a frame to form an inclined path, with the axes of the rollers aligned transversely of the path, said spreading machine comprising:

a. at least one support frame mounted on the eviscerator frame and extending across the inclined path of the eviscerator frame;

b. adjustment means connected to said support frame for varying the height of said support frame above the eviscerator rollers;

c. at least one rotary spreader fan mounted on said support frame having an axis of rotation extending in the direction of the rollers, said axis being substantially perpendicular to the plane of the rollers, and said fan having blades radiating outwardly from said axis for distributing the scallop meats more evenly on the rollers, lengthening the time the scallops are subjected to the action of the eviscerator rollers and urging the scallops into the nips of the rollers; and

d. drive means connected to said support frame for rotating said spreader fan blades in a plane parallel with the inclined path.

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**3,864,789**

## SPRING CLIPS

**Kajetan Leitner, Winacker, 8177 Bad Tölz, Bavaria, Germany**

**Filed June 19, 1973, Ser. No. 371,344**

**Claims priority, application Germany, June 21, 1972, 2230309; Nov. 28, 1972, 2258213; Feb. 23, 1973, 2309144**

**Int. Cl. A44b** *21/00, 19/06*

**U.S. Cl. 24—73 MF** **4 Claims**

**1.** A spring clip adapted to secure a strip to a wall by engaging flanges on the strip and projecting through an aperture in the wall, the clip comprising

a curved part,

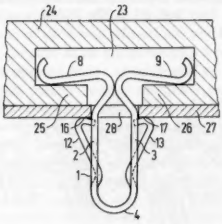
a pair of parallel legs extending from said curved part, said legs being spaced apart approximately by the width of the aperture in the wall,

a bent portion at the end of each leg opposite from said curved part, said bent portions extending in toward each other such that they almost touch,

a spring arm extending out from each of said bent portions, said arms extending away from each other and being resiliently formed back toward said curved part,

a resilient bracing lug extending out from each of said legs toward said spring arms and biased away from said legs, and

a curved pressure surface at the end of each bracing lug curved in and back away from the spring arms for holding




the wall and the flange on the strip between said pressure surfaces and said spring arms, the curved pressure surfaces preventing damage to the wall.

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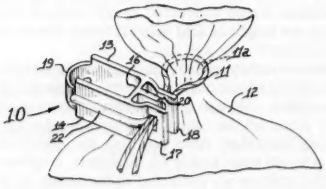
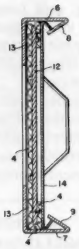
**3,864,790**
**ROPE LOCK DEVICE**
**Ernest William Reinwall, Jr., 3816 W. Idle Dell, McHenry, Ill. 60050**
**Filed Mar. 25, 1974, Ser. No. 454,178**
**Int. Cl. B65d** *77/10*; **F16g** *11/00*
**U.S. Cl. 24—129 R** **9 Claims**




1. In a rope lock device for receiving a length of flexible rope and holding the rope against movement until selectively released therefrom, the combination comprising: a yieldable, central support member, a pair of spaced apart arm means secured to said yieldable, central support member and extending therefrom in a first direction selectively to be pressed together from a neutral position for bending of said yieldable, central support member, first and second spaced apart, movable gripping members secured to said yieldable, central support member and extending therefrom in a second direction, said first and second gripping members having aligned apertures formed therethrough of a size to receive at least one length of a rope of given diameter, said first and second spaced apart gripping members being movable away from and toward one another upon pressing and releasing, respectively, of said arm means, and a third gripping member secured to said yieldable, central support member to be positioned between said first and second spaced apart movable gripping members, said third gripping member having an aperture therethrough which is substantially completely out of registry with the apertures through said first and second gripping members when said pair of arms are in their neutral position for forming a bight portion of the rope segment passing through said apertures of said first, second and third gripping means to lock the rope in place, the apertures of said first, second and third gripping members being placed in substantial registry with one another when said arm means are pressed together, thereby removing said bight portion from said rope segment for releasing the rope for free movement through said first, second and third gripping members.

**3,864,791**
**DECORATIVE BELT BUCKLE**
**Virginia H. Bishop, 2864 N.E. 25th Ct., Fort Lauderdale, Fla. 33305**
**Filed Apr. 26, 1973, Ser. No. 354,548**
**Int. Cl. A44b** *11/00*
**U.S. Cl. 24—163** **3 Claims**




1. A belt buckle, comprising:
a. a frame member having a generally U-shaped cross-section with a rectangular front wall portion having four sides which define a central opening therein, two opposed side walls extending generally perpendicular to said rectangular front wall portion in the rearward direction, and return securement portions extending inwardly from the rearward-most edge of each of said side walls at an acute angle with respect to each said respective side wall, said frame member defining a channel having free access from at least one end thereof in the direction parallel to said opposed side walls,
b. means for mounting a decorative fabric including a first slide member similar in shape to, and smaller than the outer dimensions of said rectangular front wall portion and being adapted for slidable insertion into said frame member channel while having a decorative fabric stretched across the front face and folded around the edges thereof so as show through said central opening of said frame member rectangular front wall portion, said first slide member further having a plurality of projections extending rearwardly around the periphery of its rear face for engaging and securely holding said decorative fabric taut across said front face of said first slide member,
c. a second slide member of substantially the same size and shape as said first slide member for sliding between said first slide member and said return securement portions of said frame member so as to firmly hold said first slide member in place, said second slide member having at least one integral loop for a belt.

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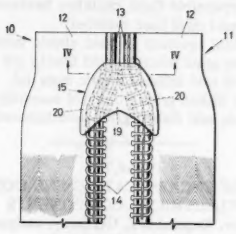
**3,864,792**
**BRIDGE TOP STOP FOR SLIDE FASTENERS**
**Kihei Takahashi, Uozu, and Hideo Takabatake, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed June 21, 1974, Ser. No. 481,835**
**Claims priority, application Japan, June 25, 1973, 48-72115**
**Int. Cl. A44b** *19/36*
**U.S. Cl. 24—205.11 R** **5 Claims**

1. In a slide fastener including a pair of stringers each having a tape carrying a row of interlocking fastener elements on one inside edge thereof, and a slider slidable along said rows of fastener elements for coupling and uncoupling the same, a bridge top stop comprising a body adapted to be secured in position to the adjacent edges of said pair of stringers, and means on said body for defining a downwardly diverging, inverted Y-shaped guide channel therethrough, said guide channel being adapted to receive corresponding parts of said

rows of fastener elements throughout the entire length thereof, in such a manner that some of the fastener elements



including the topmost ones of the respective stringers interengage within said body.

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**3,864,793**

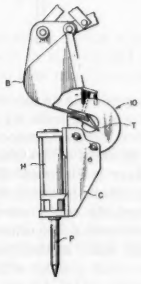
**MULTIPLE TOOL ATTACHMENT**

**William H. Guest, Apt P7-5, Panther Valley, Hackettstown, N.J. 07840**

**Continuation-in-part of Ser. No. 266,097, June 26, 1972, abandoned. This application Sept. 11, 1973, Ser. No. 396,265**

**Int. Cl. A44b** *21/00*; **E02f** *3/76*

**U.S. Cl. 24—243 CC** **18 Claims**



1. Apparatus for attaching alternately useable tools to the bucket of an earth working machine comprising:

a. means for defining a generally C-shaped structure comprising a pair of spaced arms having a slot between them for reception of a plate of a bucket in the slot, said means comprising a pair of spaced parallel plates each of generally C-shape,

b. bearing means,

c. means movably carried by one said arm and supporting said bearing means for moving said bearing means toward and away from said other arm,

d. bearing bar means extending transversely of said slot and attached to said other arm,

e. and means on said structure for supporting a tool.

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**3,864,794**

**APPARATUS FOR SLITTING AND OPENING A KNIT TUBE**

**Heinz Baumann, Falkensteinstr. 5a, Augsburg, Germany**

**Filed Nov. 14, 1973, Ser. No. 415,765**

**Claims priority, application Germany, Nov. 7, 1972, 2254371**

**Int. Cl. D06h** *7/08*; **D06c** *5/00*

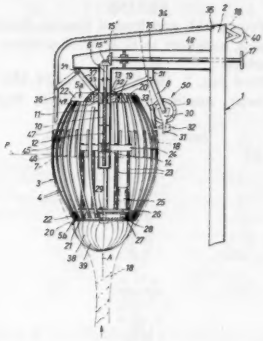
**U.S. Cl. 26—55 C** **10 Claims**

1. An apparatus for opening a knit tube advancing along an axis, said apparatus comprising:

a pair of axially spaced supports rotatable about and centered on said axis;

an array of like elongated flexible elements angularly equispaced about said axis and bridging said supports;

means for displacing at least one of said supports axially toward and away from the other support thereby bowing



said flexible elements and changing the maximum diameter of said array;

cutting means for slitting a knit tube drawn axially over said array; and

mechanism for directing said cutting means tangentially at the region of said array corresponding to said maximum diameter.

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**3,864,795**

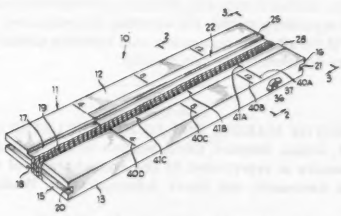
**FRINGE MEASURE**

**Josephine Francis Fisher, 44 Emerson Dr., Norwood, Mass. 02062**

**Filed July 9, 1973, Ser. No. 377,645**

**Int. Cl. D04d** *7/08*

**U.S. Cl. 28—2** **1 Claim**



1. A fringe making device including a base member having an upper surface, a lower surface and a pair of end surfaces; fringe receiving means comprising a laterally extending groove formed in at least one of said upper or lower surfaces adapted to receive and confine strands of fringe material wound around said base member parallel to said groove; a cutting groove defined in at least one of said end surfaces disposed at an angle to said laterally extending groove; an extensible insert member having an upper surface and a lower surface including a laterally extending groove formed in at least one of said upper or lower surfaces, said insert member adapted to be positioned relative to said base member such that said laterally extending groove of said insert member is in registry with said laterally extending groove of said base member, said insert member being cooperative with said base member to extend from said base member to increase the effective length of said firnge making device, and releasable fastening means disposed between said base member and said

insert member adapted to releasably secure said base member and said insert member in any of a number of predetermined relationships.

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3,864,796

## METHOD AND APPARATUS OF HANDLING WOUND SKEINS

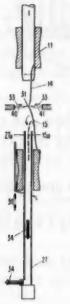
Walter Risi, Frauenfeld, and Rudolf Knecht, Kollbrunn, both of Switzerland, assignors to G & W Maschinen AG, Pfaffikon, Switzerland

Filed Jan. 2, 1974, Ser. No. 429,851

Claims priority, application Switzerland, Sept. 3, 1973, 12629/73

Int. Cl. B65h *67/04*

U.S. Cl. 28—21 10 Claims



7. In an automatic skein winding machine comprising parallely disposed rotating spindles an apparatus for automatic simultaneous handling of a series of skeins after the winding, said apparatus comprising per spindle a separating device for separating the connecting yarn between the skein ejected from the spindle and the non-ejected skein, said separating device having movable members for directing the connecting yarn before the separation to a predetermined locality, the apparatus further comprising a catching device synchroneous to said separating device for catching the yarn end of the ejected skein after the separation, said catching device having members positionable to said locality.

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3,864,797

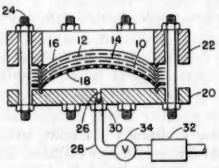
## METHOD OF MAKING DISHED ION THRUSTER GRIDS

Bruce A. Banks, Olmsted, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautic and Space Administration, Washington, D.C.

Filed Apr. 18, 1973, Ser. No. 352,381

Int. Cl. H01j *9/02*

U.S. Cl. 29—25.18 8 Claims




1. A method of forming matched pairs of dished grids to a substantially hemispheroidal configuration for ion thruster accelerator systems comprising the steps of placing an elastic sheet on a rigid base member,

aligning a pair of substantially flat grid blanks to form an assembly with said elastic sheet,

clamping the marginal peripheral portions of said assembly with a ring to prevent slippage of said assembly and to form an expansible fluid chamber between said elastic sheet and said rigid base member,

applying a fluid pressure to said elastic material thereby inflating the same whereby said blanks are dished to the curvature of said inflated elastic material,

removing the dished grids from said assembly, and

stress relieving said dished grids simultaneously.

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3,864,798

## METHOD OF ENCAPSULATING END-CONTACTED ELECTRICAL COMPONENTS

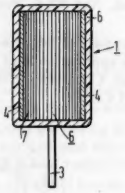
Ferdinand Utner, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 22, 1973, Ser. No. 390,393

Claims priority, application Germany, Sept. 1, 1972, 2243203

Int. Cl. H01g *13/00*

U.S. Cl. 29—25.42 8 Claims




1. A method of encapsulating an electrical component with a continuous layer of synthetic resin material which serves as insulation and protection, the component including end contacts, comprising the steps of: attaching a metal foil to the component so that there is electrical discontinuity between the end contacts while contemporaneously electrically insulating the metal foil from the entire component; placing the component in an environment of synthetic resin powder; and heating the comonent while in the synthetic resin powder environment to sinter resin powder adhering to the component.

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3,864,799

## TOOL HOLDER

James F. McCreery, Latrobe, and Dennis G. Jones, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

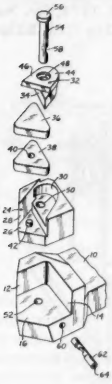
Filed Jan. 19, 1973, Ser. No. 325,014

Int. Cl. B26d *1/00*

U.S. Cl. 29—96 6 Claims

1. In a turning tool; shank means having an upwardly opening first pocket of substantial size formed therein at one end, a nest member having an upwardly opening second pocket formed therein for receiving a polygonal shim-insert combination with the insert lying on top of the shim while leaving the top face and at least a part of the periphery of the insert exposed, said second pocket having two angularly related surfaces that engage the insert and three angularly related surfaces that engage the shim, said nest member being of substantial size and loosely seated in said first pocket, a clamp member on the nest member having a portion overlying an insert in said second pocket and engaging two surfaces of said insert, said clamp member also having a portion overlying said nest member, a clamp pin extending through said clamp member and said nest member and into said shank means, a head on said clamp pin engaging the side of said clamp member which faces away from said nest member, a notch formed in said clamp pin and a cam rotatable in said shank means and

having an eccentric region engaging said notch in said clamp pin and operable to urge said clamp pin in the axially down-



ward direction in said shank means to cause said clamp member to clamp an insert in said second pocket while simultaneously clamping said nest member in said first pocket.

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**3,864,800**

**MANUFACTURING OF SHOES FOR VEHICLE BRAKES**

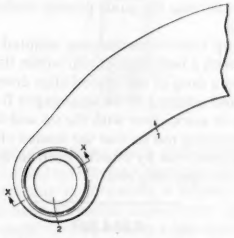
**Robert Valentine Mathers, Chester, and Derek Unsworth, Wrexham, both of England, assignors to Rubery Owen-Rockwell, Limited, Darlaston, England**

**Filed Aug. 6, 1973, Ser. No. 385,879**

**Claims priority, application Great Britain, Aug. 12, 1972, 37694/72**

**Int. Cl. B21d** *53/10*

**U.S. Cl. 29—149.5 R** **4 Claims**



**1.** A method of forming the bearing opening for the pivot pin in the web of a shoe of an internal shoe-drum brake comprising the steps of piercing the web at the required position, extruding the web at the pierced hole, forming the extruded portion to increase the thickness of the web around the opening, and finally machining the opening to suit the pivot pin.

**3,864,801**

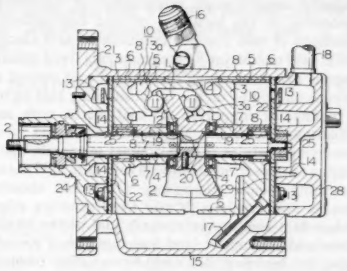
**SWASH PLATE COMPRESSOR**

**Shozo Nakayama, and Masayuki Kurahashi, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi-ken, Japan**

**Continuation of Ser. No. 118,252, Feb. 24, 1971, abandoned. This application Nov. 20, 1973, Ser. No. 417,533**

**Int. Cl. B23p** *15/00;* **F04b** *1/14*

**U.S. Cl. 29—156.4 WL** **2 Claims**



**1.** A method of manufacturing a compressor cylinder block comprising providing an integral unit having a plurality of integrally joined sleeves defining corresponding cylinder bores assembled in fixed relationship, said integral unit comprising a bore defining a drive shaft bearing joining said sleeves integrally and holding said sleeves in fixed assembly accurately relative to each other and said bore, machining internal surfaces defining said bores, casting a cylinder block having cast portions bonded to said integral unit fixing said integral unit in said casting and fixing said sleeves for access to said bores thereof from exteriorly of said casting.

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**3,864,802**

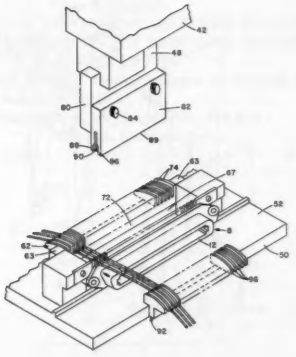
**APPARATUS FOR TRIMMING CONDUCTORS AND INSERTING TRIMMED CONDUCTORS INTO CONNECTING DEVICES**

**John James Tucci, Winston Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 15, 1974, Ser. No. 442,958**

**Int. Cl. H01r** *43/00;* **H05k** *13/06*

**U.S. Cl. 29—203 MW** **9 Claims**



**1.** Apparatus for simultaneously trimming each of a plurality of conductors and inserting the trimmed conductors into the conductor-receiving portions of electrical contact terminals which are contained in an electrical device such as a multi-contact electrical connector, said apparatus comprising: press means comprising a press ram and a press platen, said

ram being reciprocable along a predetermined path towards and away from said platen,

locating means on said platen for locating said electrical device in a predetermined position with said conductor-receiving portions of said contact terminals opposed to said ram,

conductor jig means, said jig means having a central opening and having conductor-positioning means on each side of said central opening for poistioning said conductors in parallel spaced-apart relationship at locations corresponding to the locations of said conductor-receiving portions of said contact terminals in said electrical device, said conductor jig means having fixed shearing edge means extending along ond side of said central opening, means on said jig means for positioning said jig means on a connector supported on said platen with said fixed shearing means in alignment with said conductor-receiving portions of said contact terminals, and

shearing and inserting means on said ram, said shearing and inserting means comprising a movable shearing edge means cooperable with said fixed shearing edge means when said ram moves towards said platen to shear and trim said conductors, and insertion punch means on said ram for inserting said conductors, after trimming, into said conductor-receiving portions of said contact terminals whereby

upon positioning said electrical device on said platen, placing said locating means on said electrical device, locating conductors in said jig means, and moving said ram towards said platen, said conductors are trimmed and are moved through said central opening and into said conductor receiving portions of said contact terminals.

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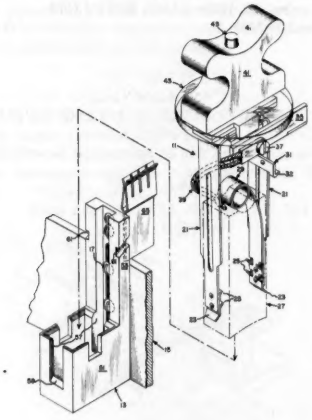
**3,864,803**

## CARTRIDGE BRUSH HOLDER

**Harry O. Ohmstedt, Saratoga Springs; William H. Ruth, and Edward E. Gibbs, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 14, 1974, Ser. No. 442,506**
**Int. Cl. H02k** *15/00*
**U.S. Cl. 29—205 R** **9 Claims**



1. A device for mounting and removing an electrically conductive brush adjacent a dynamoelectric machine rotating part; the device comprising:

a U-shaped brush holder including a pair of inwardly biased resilient legs for gripping a brush therebetween;

a brush box attached to the dynamoelectric machine adjacent the rotating parts; and,

means for biasing apart the brush holder legs as it is inserted into the brush box to release the brush into the brush box.

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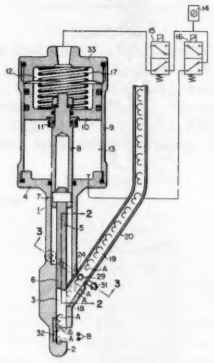
**3,864,804**

## CLIP FASTENING DEVICE

**Isao Kawaguchi, Hiroshima-ken, Japan, assignor to NHK Spring Co., Ltd., Isogo-ku, Yokohama-shi, Japan**

**Filed Feb. 27, 1974, Ser. No. 446,277**
**Int. Cl. B23q** *7/10*; **B23p** *11/00*
**U.S. Cl. 29—211 M** **8 Claims**



1. A clip fastening device comprising, in combination,

a. a device body arranged in an upright direction and including a guide passage provided in its longitudinal direction and a clip feeding outlet open at one side surface of the guide passage;

b. an operating rod slidably mounted within the guide passage of the device and having an upper jaw;

c. a lower jaw provided at the lower end of the device body so as to oppositely face the upper jaw;

d. an air cylinder mechanism mounted at the upper end of the device body to cause the operative rod to be reciprocably moved up and down;

e. an air pressure supply source for supplying air pressure to the air cylinder mechanism;

f. control means for controlling the supply of the air pressure from the supply source to the air cylinder mechanism;

g. a clip case disposed in a substantially upright direction and having its lower end mounted to the clip feeding outlet, said clip case having loaded therein a plurality of clips tending to be sequentially dropped through the clip feeding outlet into the guide passage under a gravitational force; and

h. a clip drop control mechanism adapted to be normally engaged with a bottommost clip within the clip case so as to prevent a drop of the loaded clips down into the guide passage and adapted to be disengaged from the bottommost clip in association with the up and down movement of the operating rod so that the loaded clips are intermittently dropped one by one for each reciprocatory movement of the operating rod.

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**3,864,805**

## MACHINE FOR INDEXING AND SCREW-MOUNTING OBJECTS TO A WORK PIECE

**Edward O. Klukos, 2855 E. Judson, Spring Lake, Mich. 49456**

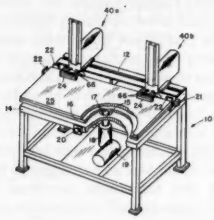
**Division of Ser. No. 290,876, Sept. 21, 1972, Pat. No. 3,811,170. This application Jan. 23, 1974, Ser. No. 435,866**
**Int. Cl. B23q** *7/10*; **B23p** *19/04*
**U.S. Cl. 29—211 R** **26 Claims**

1. A machine for attaching objects to a work piece comprising:

a housing supporting reciprocating means having a powered fastening tool mounted thereto, said reciprocating means including gripping means at one end for releasably gripping fastening means;

means for holding a work piece in predetermined relationship to said housing;

means for receiving fastening means and positioning said fastening means in alignment with said gripping means;



dispensing means for singly dispensing objects to be attached to said work piece in predetermined alignment with said gripping means; and

control means for sequentially actuating said reciprocating, gripping and positioning means to advance fastening means in a manner to capture an object from said dispensing means and further advance said fastening means into contact with said work piece whereupon said gripping means releases said fastening means and permits the object to be attached to said work piece by said fastening tool.

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**3,864,806**

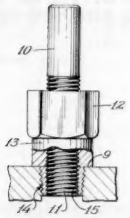
## METHOD OF REPAIRING STRIPPED SPARK PLUG THREADS IN ENGINE HEADS

**Le Roy P. Hanson, 170 Pine So., Prescott, Wis. 54021, and Calvin E. Trost, Rt. 4, Hastings, Minn. 55033**

**Continuation of Ser. No. 196,357, Nov. 8, 1971, abandoned. This application Sept. 10, 1973, Ser. No. 396,066**

**Int. Cl. B23p** *7/00*

**U.S. Cl. 29—401** **1 Claim**



1. The method of repairing spark plug apertures in engine head made of resilient soft metal which have stripped threads, the method consisting in threading a slightly externally tapered and internally threaded imperforate and unnotched sleeve of hard metal free of cutting edges onto a supporting shank against an abutment, said externally threaded surface having unbroken and uninterrupted threads through its length, the peripheries of said threads being on said externally tapered surface, applying the smaller diameter end of said sleeve to an end of said stripped aperture, rotating the sleeve to thread the sleeve into the aperture, the hard metal of said sleeve acting to displace the soft metal during the formation of the new threads so that no loose particles are formed, said threading action acting to compact the soft metal outwardly of the aperture, removing the shank and threadably inserting a spark plug into said sleeve.

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**3,864,807**

## METHOD OF MANUFACTURING A SHAPED ELEMENT OF FIBER-REINFORCED MATERIAL

**Friedrich Schneider, and Dieter Stockel, both of Pforzheim, Germany, assignors to G. Rau, Pforzheim, Germany**

**Continuation of Ser. No. 203,381, Nov. 30, 1971, abandoned. This application Sept. 19, 1973, Ser. No. 398,778**

**Claims priority, application Germany, Dec. 2, 1970, 2059179**

**Int. Cl. B23p** *17/00*

**U.S. Cl. 29—419 R** **7 Claims**

1. A method for producing a shaped element formed of a homogeneous matrix substance and having intimately embedded therein a plurality of substantially circular reinforcing fibers of a diameter in the magnitude of microns, the ductility properties of said matrix substance and said fibers being substantially different, said method consisting essentially of the steps of:

rigidly and metallurgically connecting to each of a plurality of substantially circular wires of reinforcing material a jacket of said matrix substance, each of said wires having a diameter in the magnitude of millimeters;

arranging said plurality of thus jacketed wires in a loose bundle in contact with each other; and

subjecting said bundle to a non-cutting mechanical working operation;

thereby reducing the cross-sectional area of said wires and said jackets, the cross-sectional area of said wires being reduced from a magnitude of $mm^2$ to a magnitude of $10^{-6}mm^2$, mechanically bonding said jackets together into a uniform homogeneous matrix, subjecting said jacketed wires to a diffusion treatment to facilitate the mechanical bonding of said matrix, and generating said substantially circular micron sized fibers embedded in said uniform homogeneous matrix, thereby reinforcing said matrix.

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**3,864,808**

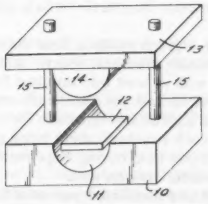
## METHOD OF DEFORMING SINTERED MAGNETS WITHOUT SIGNIFICANTLY REDUCING MAGNETIC PROPERTIES

**Manfred Doser, Edmore, Mich., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Sept. 6, 1973, Ser. No. 394,634**

**Int. Cl. B22f** *3/24*

**U.S. Cl. 29—420.5** **6 Claims**



1. The method of forming a sintered magnet produced from powdered metal into various shapes by plastic deformation without significantly reducing desired magnetic properties which comprises:

heating said magnet to a temperature below the melting temperature but at a temperature at which plastic deformation can take place,

and, while maintaining said temperature, die-forming said magnet at a rate slow enough to prevent recrystallization.

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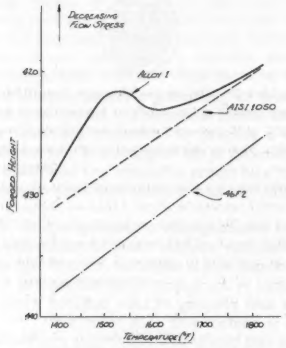
**3,864,809**

## PROCESS OF PRODUCING BY POWDER METALLURGY TECHNIQUES A FERRITIC HOT FORGING OF LOW FLOW STRESS

**Stephen James Donachie, New Windsor, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.**

**Filed Mar. 29, 1973, Ser. No. 345,981**
**Int. Cl. B22f 3/24**
**U.S. Cl. 29—420.5** **5 Claims**




**5.** In the process of producing by powder metallurgy techniques a steel hot forging wherein die wear is reduced, which process comprises forming a preform from a ferritic alloy steel powder, and hot forging said preform at a temperature not greater than about 1550°F., said powder consisting essentially of from 0.25 to less than 1.5 percent nickel, 0.75 to 2.25 percent copper, 0.1 to 0.6 percent molybdenum, up to 0.5 percent manganese, up to 0.3 percent silicon, up to 0.5 percent chromium, up to 0.02 percent boron, up to 0.05 percent carbon and the balance essentially iron.

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**3,864,810**

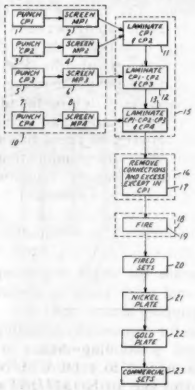
## PROCESS AND COMPOSITE LEADLESS CHIP CARRIERS WITH EXTERNAL CONNECTIONS

**Billy M. Hargis, Cleveland, Ohio, assignor to Minnesota mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sept. 27, 1972, Ser. No. 292,806**
**Int. Cl. B23p 17/00**
**U.S. Cl. 29—423** **4 Claims**

**1.** A process for the production of ceramic sets of devices such as chip carriers comprising pluralities, of at least about four, of conjunct small multilayer ceramic devices having exterior and interior electrical contacts comprising the steps of:

1. preparing a green ceramic base sheet and at least two green ceramic structural sheets, said base sheet being provided with at least one terminal for each of said ceramic devices and an electrically connecting network between at least all said terminals for each of said ceramic sets, and each structural sheet being provided with
   a. at least one hole having edge metallizing for each of said ceramic devices, and,
   b. at least one metallized pad area for each of said ceramic devices near said hole and further holes laterally adjacent to said pad area, each said pad area being connected to said edge metallizing,
2. erecting a multiplicity of connected multilayer green devices by successive lamination of said green ceramic structural sheets on said green ceramic base sheet in registry to one another so that edge metallizing of successive structural sheets is commonly connected, at least in the same set, to the electrically connecting network of said base sheet,
3. removing green ceramic material connecting said multilayer green devices and superfluous thereto while substantially retaining said edge metallizing and interconnections of green ceramic of said base sheet and at least the electrically connecting network for each said set whereby green sets comprising a plurality of electrically connected multilayer green ceramic devices connected by green ceramic are formed and,
4. firing said green sets to maturity whereby sets of ceramically and electrically connected conjunct small multilayer ceramic devices are obtained in which there is interconnection of all exposed metallic surfaces.

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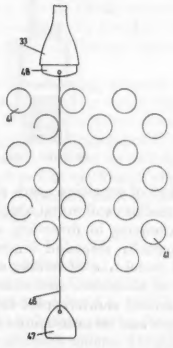
**3,864,811**

## METHODS OF ASSEMBLING TUBE SUPPORTS

**Frank Walker, Stoneclough, England, assignor to Hick, Hargreaves and Company Ltd., Bolton, England**

**Filed Oct. 13, 1972, Ser. No. 297,482**
**Int. Cl. B21d 39/00; F28d 7/00**
**U.S. Cl. 29—455** **3 Claims**




**1.** In a method of assembling heat-exchange apparatus comprising a metal tube bundle, and flexible resilient tubing threadable between the tubes of said metal tube bundle by means of a detachable clamping and insertion tool adapted to

pass between adjacent metal tubes, said tool including two clamping members disposable face to face and of which one is pivotable on the other about an axis substantially perpendicular to the mating faces between a first position in which the two members are face to face so as to form a clip for sealing the end of the resilient tubing, and a second position in which the mating faces are separated and the tubing is released from between the members or can be inserted for subsequent gripping by the members and said tool being provided with remote manipulation means; the improvement comprising: inserting one end of the resilient tubing between said clamping members in the second position of the latter; effecting relative pivoting of said members into the first position thereof to sealingly clamp said one end of the resilient tubing; evacuating said resilient tubing so as to deform the tubing into a flattened condition; sealing the remote end of said resilient tubing; pushing the tool between adjacent tubes of said metal tube bundle by operation of said manipulation means to draw the flattened resilient tubing between said tubes; effecting relative pivoting of said members about said axis into the second operative position of the latter for releasing the resilient tubing from said members and to expand the tubing into its initial configuration; and withdrawing said tool from said metal tube bundle.

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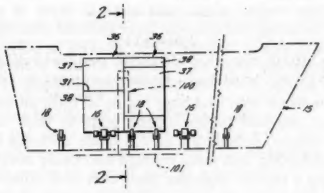
**3,864,812**

## METHOD FOR ASSEMBLY OF CYLINDRICAL WELDED TANKS IN SITU IN HORIZONTAL POSITION

**Harry J. Fiegel, Jr., Leaque City, and Russell S. Thatcher, Alvin, both of Tex., assignors to Kelso Marine, Inc., Galveston, Tex.**

**Filed Jan. 30, 1973, Ser. No. 327,957**
**Int. Cl. B23k *31/02***
**U.S. Cl. 29—471.1** **1 Claim**



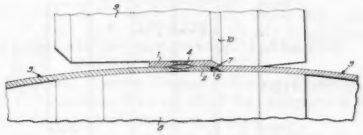
1. A method of assembling a cylindrical container in situ in horizontal position comprising the steps of:
   a. positioning a first ring of predetermined size on support roller means so that the longitudinal axis of the ring is substantially horizontal;
   b. positioning a predetermined number of additional rings on support roller means in end to end relation to the first ring;
   c. simultaneously rotating the rings while welding them together at their circumferential joint formed by adjacent rings;
   d. closing the ends of the cylindrical container;
   e. removing the roller support means from the container; and
   f. providing a plurality of spaced saddle means to support the container when the roller means are removed.

**3,864,813**

## PROCESS FOR CONDITIONING THE WELDING AREA OF THE CYLINDRICAL BODY OF A PACKING CAN

**Jean Morjan, Koekelberg-Brussels, Belgium, assignor to Etablissements J. B. Gabriels S.P.R.L., Brussels, Belgium**

**Filed July 3, 1973, Ser. No. 376,115**
**Claims priority, application Belgium, June 6, 1973, 52820**
**Int. Cl. B23k *31/02***
**U.S. Cl. 29—475** **2 Claims**



1. A process for conditioning the welded lapped seam area of the body of a cylindrical packing can comprising:
   a. lap seam welding the ends of the body of a cylindrical packing can to produce a joint having an inner free edge;
   b. passing said welded lapped seam area along the weld direction through a roller pair comprising a first inner roller having an outer transverse contour corresponding to the internal diameter of said can body and a second outer roller having two sections of different diameters separated by an offset step portion of a height substantially equal to the thickness of said can body, said rollers being separated by a distance substantially equal to the thickness of the can body in the area between the larger diameter section of the second roller and said first roller, and a distance substantially equal to the lapped seam thickness in the area between the smaller diameter section of said second roller and said first roller, said lapped seam area passing through said roller pairs so that said offset step portion of said second outer roller is positioned closely opposite said inner free edge of the welded lapped seam during the conditioning process.

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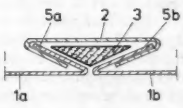
**3,864,814**

## SEAMING METHOD FOR SHEET METAL DUCTS

**John Bagge, Turku, Finland, assignor to Valmet Oy, Helsinki, Finland**

**Filed June 22, 1973, Ser. No. 372,705**
**Claims priority, application Finland, July 3, 1972, 1890/72**
**Int. Cl. B21d *39/02***
**U.S. Cl. 29—514** **3 Claims**



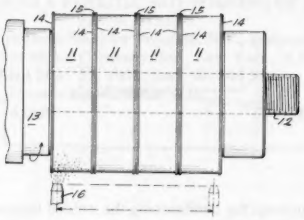

1. Method of seaming the opposed edges of sheet metal ducts, particularly for use in transversely seaming ducts, comprising:
   providing on the edges to be joined, half-closed bends diverging from each other; placing upon the bends a packing;
   uniting the bends with a strip having a substantially triangular cross-section and encircling the bends; and
   tightening the seam produced by the above steps by pressing the central part of the strip against the packing and at the same time providing support of the seam under the strip, between the strip and the edges, so that the strip, thus pressed tight, assumes a V-shape projecting from the duct wall from its center towards its margins.

3,864,815

## METHOD OF MAKING A LINED DIE CASTING BY EMPLOYING A TRANSPLANT COATING

James H. Koch, Oregon, Ohio, assignor to N. L. Industries, Inc., New York, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,065
Int. Cl. B23p 17/00
U.S. Cl. 29—527.3 4 Claims



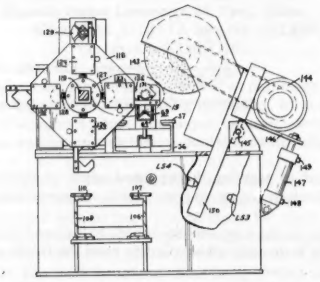
1. A method of forming a die casting having an interior longitudinal bore surface which is coated with a hard wear resistant material and side faces which are initially formed with bead portions that are machined off in the finishing of the completed casting, which method comprises assembling on an arbor a group of die cores and interposed masking plates between the cores, spraying the coating material over the exposed peripheral surfaces of the cores and masking plates, individually separating the core assemblies from each other so that each core remains attached to at least one masking plate and the coating thereon remain undisturbed, introducing the coated core and attached masking plate into a die, introducing molten metal into the die under normal die casting pressures to adhere to the coating material, removing the completed casting and core and masking plate from the die as a unit, separating the core and masking plate from the casting leaving a coated longitudinal bore and a coated extending bead portion in that area where the masking plate occurred, and machining away the extending bead and its coating material to leave a smooth active side face of the die casting.

3,864,816

## CYLINDRICAL STOCK MACHINING APPARATUS

Paul C. Brusch, 342 W. Ridge Pike, Limerick, Pa. 19468

Filed Apr. 1, 1974, Ser. No. 456,978
Int. Cl. B23q 7/00; B23p 23/00
U.S. Cl. 29—563 28 Claims



27. Apparatus for cutting to size and machining the ends of elongated cylindrical stock material, comprising in combination,

a. stock feeding means for securely holding a long piece of cylindrical stock and effective when actuated for shifting the latter along its cylindrical axis,

b. stock size sensing means for sensing when the leading section of the long stock piece being axially shifted by said stock feeding means is of a pre-determined length,

c. stock cutting means effective when actuated to sever the leading section of said stock from the remainder of said long piece of cylindrical stock, the said severed leading section constituting a work-piece,

d. work-piece end machining means effective when actuated to carry out a desired machining operation on at least one end of said work-piece,

e. work-piece transport means effective when actuated to transport said work-piece from said stock cutting means to said machining means and from said machining means to a work-piece discharge station, and

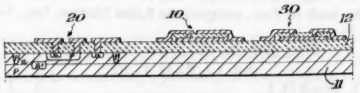
f. means operative to automatically initiate and complete successive cycles of the operations sequentially performed by the aforesaid means upon said elongated piece of stock material until the same is exhausted.

3,864,817

## METHOD OF MAKING CAPACITOR AND RESISTOR FOR MONOLITHIC INTEGRATED CIRCUITS

Jerome F. Lapham, Jr., Shrewsbury, and John A. Mataya, Grafton, both of Mass., assignors to Sprague Electric Co., North Adams, Mass.

Division of Ser. No. 266,199, June 26, 1972, abandoned. This application Aug. 3, 1973, Ser. No. 385,362
Int. Cl. B01j 17/00
U.S. Cl. 29—577 4 Claims



1. A method of making a planar monolithic integrated circuit having a bipolar NPN transistor and a compatible capacitor, said method comprising growing an epitaxial N-type silicon layer on a P-type silicon substrate, producing a P-type base region within said epitaxial layer at a surface thereof, covering said epitaxial layer and said base region with a dielectric silicon dioxide layer, growing a polycrystalline silicon capacitor plate on a portion of said dielectric layer laterally spaced from said base region, diffusing N-type imparting material into said base region to form an emitter region and into said polycrystalline plate to dope said plate heavily N-type, providing a silicon oxide covering over said plate, contacting said plate through said oxide covering, and depositing a second capacitor plate over said oxide covering.

3,864,818

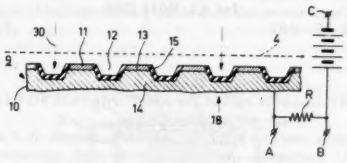
## METHOD OF MAKING A TARGET FOR A CAMERA TUBE WITH A MOSAIC OF REGIONS FORMING RECTIFYING JUNCTIONS

Else Kooi, and Arthur Marie Eugene Hoeberechts, both of Emmasingel, Eindhover, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 31,516, April 24, 1970, Pat. No. 3,737,702. This application Feb. 20, 1973, Ser. No. 334,035
Claims priority, application Netherlands, May 6, 1969, 6906939
Int. Cl. B01j 17/00
U.S. Cl. 29—578 10 Claims

1. A method of manufacturing a radiation-sensitive target plate for use in a camera tube comprising a semi-conductor plate having on one side thereof a mosaic of projecting regions separated from one another by grooves and each forming with the plate a rectifying junction comprising the steps of providing an apertured masking layer on one surface of a plate of semi-conductor material having adjacent said surface a zone of one conductivity type, removing material from the surface

of the plate at the area of the apertures in said apertured masking layer to obtain grooves of a given depth separating the regions, oxidizing the semiconductor plate only in the




grooves to provide a first insulating oxide layer thereon, then removing the mask and leaving the underlying surface of said plate exposed so as to provide the mosaic of projecting regions.

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**3,864,819**

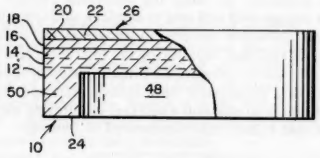
## METHOD FOR FABRICATING SEMICONDUCTOR DEVICES

**Robert S. Ying, Torrance, Calif., assignor to Hughes Aircraft Co., Culver City, Calif.**

**Continuation-in-part of Ser. No. 95,652, Dec. 7, 1970, abandoned. This application Sept. 29, 1971, Ser. No. 184,767**

**Int. Cl. B01j** *17/00*

**U.S. Cl. 29—583** **15 Claims**




**1.** A method for simultaneously fabricating a plurality of semiconductor devices from a metal plate and a semiconductor wafer comprising a two-faced substrate having a doped surface at one face and a second surface at the second face comprising the steps of:

metallizing the doped surface of the wafer;

affixing the wafer at its metallized surface to a disc of substantially the same circumferential configuration as that of the wafer by use of wax at a temperature and for a period of time to completely seal the wafer and the disc together at their matching surfaces;

press fitting the wafer and the disc in one end of a holder having a recessed opening means in one end thereof, the recessed opening means having substantially the same circumferential configuration as that of the wafer and having a dimensional depth sufficient to align the second surface of the water flush with the holder end;

sealing the holder end and the second surface of the wafer at the peripheral edge thereof with wax to expose only an interior portion of the second wafer surface, the interior portion having a surface area less than that of the wafer;

uniformly etching the exposed interior portion in an etching solution by alternatively rotating the holder and stirring and agitating the solution to thin the interior portion, and to form a rim of substrate material protected by wax, the wax and the holder being of a material inert to the solution;

removing the holder, the wafer and its thinned exposed portion from the solution and rinsing the same with deionized water;

separating the thinned wafer from the holder, disc and wax;

thermocompression bonding the thinned wafer at its metallized surface to a plate at a pressure of 40,000 psi at 200°C;

removing the substrate rim from the wafer;

placing a photoresist layer on the thinned wafer;

removing selected portions of the masked layer of photoresist material to expose portions of the thinned wafer;

etching the exposed portions of the thinned wafer to form individual semiconductor elements on the plate; and

separating the semiconductor elements from one another by punching out sections of the plate.

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**3,864,820**

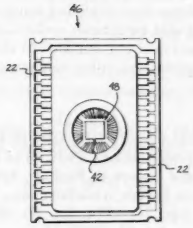
## FABRICATION PACKAGES SUITABLE FOR INTEGRATED CIRCUITS

**Robert R. Brenan, Warren; Thomas D. Bunker, Bradford, and David F. Thompson, Warren, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Continuation of Ser. No. 103,513, Jan. 4, 1971, abandoned. This application Dec. 14, 1972, Ser. No. 315,091**

**Int. Cl. B01j** *17/00*

**U.S. Cl. 29—591** **4 Claims**




**1.** A process for fabricating a package suitable for use in integrated circuits, said process comprising

a. fabricating an electrically conductive metal member comprising a frame extending around the perimeter of said member, a central pad and a high density of a plurality of individual leads each being connected to said pad and said frame, said leads comprising a plurality of component leads and at least one connecting lead;

b. molding a ceramic portion that provides a support for said pad, covers and hermetic seals a large segment of each lead without covering and sealing the portions of each lead adjacent to the pad and the frame; and

c. removing a predetermined segment of the component leads adjacent to said pad and external to said ceramic without the removal of said ceramic or any portion of said connecting lead adjacent to said pad to establish a predetermined pattern between said pad and one end of said component leads by positioning said predetermined segments under a properly designed electrode and establishing a suitable potential difference between the predetermined segments and said electrode to achieve an electrical discharge between said electrode and said predetermine segments to simultaneously remove said segments and thus produce said desired pattern.

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**3,864,821**

## METHOD OF MAKING A COMMUTATOR

**Shinichi Ito, Toyokawa, and Hideo Saji, both of, Nagoya, Japan, assignors to Nippondenso Co., Ltd.,, Aichi-ken, Japan**

**Continuation of Ser. No. 167,278, July 29, 1971, abandoned. This application Jan. 24, 1973, Ser. No. 326,476**

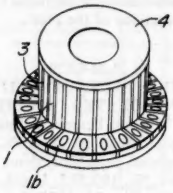
**Claims priority, application Japan, Aug. 1, 1970, 45-06743**

**Int. Cl. H01r** *43/00*

**U.S. Cl. 29—597** **3 Claims**

**1.** A process of producing a commutator comprising the steps of: providing an annular conductive ring having a plural-

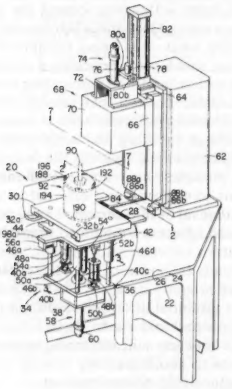
ity of parallel grooves formed on the inner periphery thereof, said grooves defining commutator segments held together by bridging portions formed across bottoms of said grooves; filling said parallel grooves with a first soft and brittle insulating material which is selected from the group consisting of: an intersticed resin, a mixture of a binder and a lubricative inorganic powder, and a mixture of a binder and a lubricative organic powder; then filling the volume defined by said conductive ring with a second insulating material having greater strength and hardness than said first insulating material; and then cutting the outer peripheral surface of said conductive ring to remove said bridging portions to thereby expose said first insulating material and isolate said commutator segments.




## 3,864,822
## APPARATUS AND A METHOD FOR FINAL ASSEMBLING OF DYNAMOELECTRIC MACHINES

Robert E. Eash, and Robert C. Burkart, both of Fort Wayne, Ind., assignors to Farlow Associates Inc., Fort Wayne, Ind.

Filed Apr. 29, 1974, Ser. No. 464,846
Int. Cl. H02k 15/02
U.S. Cl. 29—598 23 Claims



1. The method of finally assembling a dynamoelectric machine which includes a housing, a rotor rotatably disposed in the housing, and end plates closing the opposite ends of said housing, said end plates having bearings in which the rotor shafts are journalled, comprising the steps of:

a. loosely assembling said housing, rotor, and end plates with said rotor shafts journalled in said bearings,

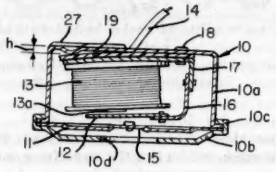
b. securing said housing, rotor and end plates into rigid assembly while,

c. simultaneously spinning said shafts in said bearings.

## 3,864,823
## METHOD OF MAKING A BUZZER STRUCTURE

Charles Berns, New Milford, Conn., assignor to General Signal Corp., Rochester, N.Y.

Filed Jan. 8, 1974, Ser. No. 431,802
Int. Cl. H01f 7/06
U.S. Cl. 29—602 7 Claims

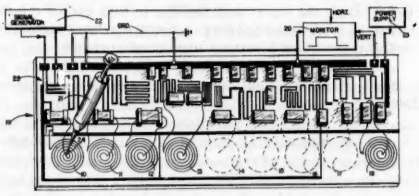



1. The method of optimally and permanently adjusting the relative positions of the elements of a nonoperative buzzer to render said buzzer operative, said buzzer being of the type comprising a housing having an energizable electric coil mounted therein and also having an armature mounted therein for movement adjacent said coil but initially spaced from said coil by a gap the dimensions of which are sufficiently large to prevent said armature from being attracted to said coil if said coil were energized, said method comprising the steps of energizing said coil, progressively deforming a portion of said housing adjacent said coil, on a side of said coil remote from said armature, to cause the deformed portion of said housing to engage said coil and to displace said energized coil toward said armature thereby to progressively reduce the dimensions of said gap, monitoring the operating condition of said buzzer as said progressive deformation step proceeds, and terminating said progressive deformation step and the resultant displacement of said coil when said monitoring step determines that said buzzer has commenced to operate.

## 3,864,824
## TUNING AND MATCHING OF FILM INDUCTORS OR TRANSFORMERS WITH PARAMAGNETIC AND DIAMAGNETIC SUSPENSIONS

James C. Watson, Newport Beach, and Roy J. Hebert, Fullerton, both of Calif., assignors to Rockwell International Corp., El Segundo, Calif.

Continuation of Ser. No. 212,193, Dec. 27, 1971, abandoned.
This application Oct. 26, 1973, Ser. No. 410,143
Int. Cl. H01f 7/06
U.S. Cl. 29—608 4 Claims




1. A method of altering the inductance of an inductive device comprising the steps of:

measuring the inductance of said device;

selecting a suspension of either a paramagnetic material or a diamagnetic material, the material selected depending on the relationship of the measured inductance value of said device to a preselected inductance value;

incrementally applying to said device the selected materials;

allowing said selected material to harden; and

again measuring the inductance of said device and applying a suspension of the other one of the paramagnetic and diamagnetic materials until said preselected inductance value is reached, said selecting step consisting of selecting the diamagnetic material when the measured inductance value of said device is greater than the preselected inductance value.

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**3,864,825**

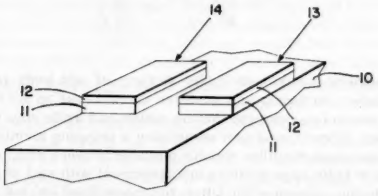
## METHOD OF MAKING THIN-FILM MICROELECTRONIC RESISTORS

**Edward S. B. Holmes, Almonte, Ontario, Canada, assignor to Microsystems International Limited, Montreal, Quebec, Canada**

**Division of Ser. No. 261,722, June 12, 1972, , which is a continuation of Ser. No. 450,076, March 11, 1974,. This application Nov. 12, 1973, Ser. No. 414,838**

**Int. Cl. H01c** *1/14*

**U.S. Cl. 29—621** **16 Claims**




**1.** A method of forming a plurality of resistors upon a surface of a substrate member, comprising the steps of;

a. depositing upon the surface of said substrate member a stack of n layers of electrically conductive material of differing resistivity, where n is an integer greater than one, said layers being deposited in decreasing order of resistivity of the layer materials;

b. defining the required areal geometry of each of said plurality of resistors and isolating each of said plurality of resistors by masking and subsequently chemically removing said n layers of electrically conductive material from the surface of the substrate adjacent and exterior to the perimeter of each of said resistors;

c. forming spaced apart terminal means for each of said resistors, the terminal means corresponding to each of said resistors being electrically connected to the top electrically conductive layer of each of said resistors.

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**3,864,826**

## METHOD OF MANUFACTURING A SEALED CONTACT

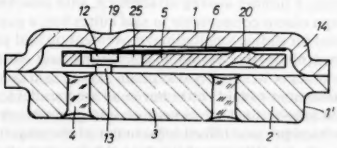
**Helmut Buttel, Leonberg-Eltingen, Germany, assignor to International Standard Electric Corp., New York, N.Y.**

**Filed Nov. 12, 1973, Ser. No. 415,029**

**Claims priority, application Germany, Dec. 1, 1972, 2258968**

**Int. Cl. H01r** *9/00*

**U.S. Cl. 29—630 B** **5 Claims**




**1.** A method of providing a sealed contact for use in an electromagnetic relay said contact having a flat base plate assembly containing a glass-to-metal seal, an electrical contact, a hood-shaped cover assembly including an armature fastened to the cover by means of an armature holding spring, the method comprising the following steps:

a. forming a pair of first holes of predetermined shape and location in said base plate assembly;

b. forming a pair of second holes of predetermined shape and location in said cover assembly;

c. positioning said base plate assembly by fitting said first holes over a first set of pegs in registry with said first holes;

d. positioning said cover assembly upon said base plate by fitting said second holes over a second set of pegs in registry with said second holes;

e. sealing said cover assembly to said base plate assembly while said cover and said base plate assemblies are held in position by means of their respective pegs;

f. removing the contact from said pegs; and

g. mounting and aligning said contact in said relay by means of said first and second pairs of holes.

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**3,864,827**

## METHOD FOR MAKING AN ELECTRIC CONTACT BY POWDER METALLURGY AND THE RESULTING CONTACT

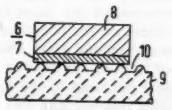
**Horst Schreiner, and Bernhard Rothkegel, both of Nuremberg, Germany, assignors to Siemens Aktiengellschaft, Munich, Germany**

**Filed Aug. 24, 1972, Ser. No. 283,409**

**Claims priority, application Germany, Sept. 1, 1971, 2143844**

**Int. Cl. H01r** *9/00*

**U.S. Cl. 29—630 C** **4 Claims**




**1.** A powdered metallurgy method for making a two-layer contact or the like, comprising:

a. providing a first layer of intermixed refractory metal or metal compound powder and a low temperature melting metal powder;

b. providing a second layer of low temperature melting metal powder;

c. compacting said first and second layers together to form a coherent two-layer compact;

d. providing a refractory surface having a plurality of depressions on the surface thereof;

e. supporting said contact with said second layer on said refractory surface with said plurality of depressions therebeneath;

f. heating said compact under non-oxidizing conditions to a temperature above the melting temperature of said low temperature melting metal to impregnate the pores of said first layer with the metal of said second layer; and

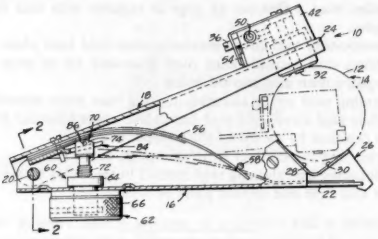
g. the step of providing said second layer including proportioning said second layer to provide said contact with a volume of said low temperature melting metal which will cause the formation on the bottom of said compact of a thin layer of low temperature metal and such that said low temperature melting metal will at least partially fill the pores in said compact.

**3,864,828**

## CABLE SCRIBING TOOL

**Robert A. Bilbrey, Orinda, and Walter J. Maytham, Los Altos, both of Calif., assignors to Speed Systems, Inc., Los Altos, Calif.**

**Filed Apr. 30, 1973, Ser. No. 355,958**
**Int. Cl. B26b** *27/00*
**U.S. Cl. 30—91.2** **4 Claims**



**1.** A tool for scribing the outer surface of a cable or the like comprising: first and second pivotally connected arms having first and second extended ends respectively; seating means associated with the first extended end and on which the cable is seatable between the first and second arms; a scriber blade associated with the second extended end and positioned to be brought into engagement with the outer surface of the cable when the cable is so seated and the first and second arms are pivoted relatively toward each other; resilient means interconnecting the first and second arms for urging the first and second arms together so that the cable therebetween is seated on said seating means and said blade is brought into engagement with the outer surface of the cable under the resilience of said resilient means; and means for selectively moving the first and second arms relatively apart against the resilience of the resilient means to allow relative insertion of the cable between and removal of the cable from between the arms, wherein the resilient means comprise a leaf spring interconnecting the first and second arms, wherein the leaf spring has one end thereof fixed to the second arm and the other end extending under a pin fixed to the first arm and disposed in bearing and sliding relation with said pin, wherein the means for selectively moving the first and second arms relatively apart comprise jack means associated with the first and second arms, and wherein said jack means comprise a first jack member associated with the first arm and defining an internally threaded bore, the first jack member being rotatable about the longitudinal axis of the bore and being generally limited from movement along said longitudinal axis of the bore, and a second jack member defining an outer threaded portion in threaded engagement with the threaded bore, the second jack member extending to adjacent the second arm, and movable along the longitudinal axis of the bore upon rotation of the first jack member, the jack means further comprising means for limiting the movement of the second jack member about the longitudinal axis of the bore, so that rotation of the first jack member in one direction moves the second jack member along the longitudinal axis of the bore to move the first and second arms relatively apart, and rotation of the first jack member in the other direction allows the first and second arms to move relatively toward each other under the resilience of the leaf spring.

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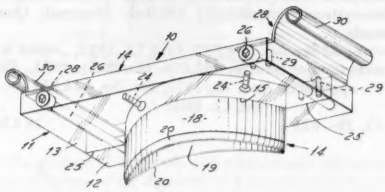
**3,864,829**

## CUTTING TOOL

**John Williams, 18331 Tipsilo Lake Rd., Fenton, Mich. 48430**

**Filed Aug. 10, 1973, Ser. No. 387,483**
**Int. Cl. B26b** *3/08*
**U.S. Cl. 30—130** **19 Claims**

**1.** A cutting tool comprising a rigid base fixedly supporting a cutter for an excising operation on a sheet-like object, said cutter presenting a knife edge defined by two knife edge portions of generally similar lunate contour, said knife edge being exposed well to a side of said base and shaped in the outline of an area on said object which is excised from the latter by the tool, said base having a lunate-shaped opening presenting mutually facing surfaces respectively shaped to complement and mate with opposite outwardly facing surfaces of said knife edge portions which partly extend into said lunate-shaped opening, which mutually facing surfaces of said opening have fixed mating and holding engagement with the



respective outwardly facing surfaces of said knife edge portions, a stripping unit mounted on said base to act from the latter's side opposite that on which said knife edge portions are exposed, said unit comprising a stripping member of lunate-shaped outline slidably movable between and relative to said knife edge portions in engagement with said object area during excision of the latter, rod means fixed on said base and extending from said opposite base side, and a guide piece spaced from and fixed on said stripping member and guided on said rod means in said movement of said stripping member.

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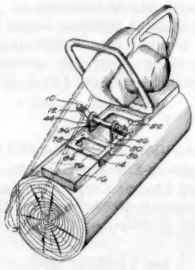
**3,864,830**

## LUMBER MAKING ATTACHMENT FOR A CHAIN SAW

**Jesse E. Haddon, Rt. 5, Burlington, Wis. 53105**

**Filed Feb. 28, 1973, Ser. No. 336,664**
**Int. Cl. B27b** *17/02*
**U.S. Cl. 30—371** **8 Claims**

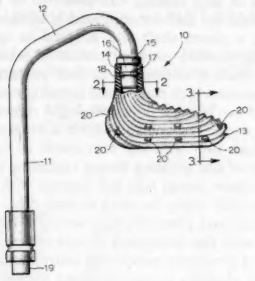


**1.** In combination, a chain saw with a cutter bar and a guide member, a lumber sawing attachment, said attachment comprising a clamp connectable to said cutter bar, a guide bracket adapted for sliding longitudinal movement on said guide member and means for pivotally connecting said clamp to said guide bracket to support said chain saw on said guide bracket for movement of said cutter bar in an arc parallel to the direction of longitudinal movement of said guide bracket on said guide member and afford adjustment of the angular position of the clamp with respect to the guide bracket about an axis transverse to the direction of movement of said bracket and at right angles to said cutter bar and thereby afford control of the depth of cut of said cutter bar.

## 3,864,831
## SALIVA EJECTOR

Daniel H. Drake, 1969 Carolina Ave. N.E., St. Petersburg, Fla. 33703

Filed Oct. 23, 1973, Ser. No. 408,754
Int. Cl. A61c 17/09
U.S. Cl. 32—33 5 Claims



1. A pliant, light-weight saliva ejector for a patient comprising

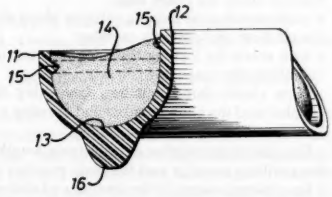
a tubular stem adapted for communication with an aspirator means and having an inverted U-shaped end portion adapted to rest upon the lower jaw of said patient and terminating above the floor of said patient's mouth, and a hollow, flexible, elongated collector head mounted on said inverted U-shaped end portion in communication with said tubular stem and adapted to be received in said patient's mouth;

said collector head having a plurality of spaced perforations for inducting saliva therethrough and a plurality of substantially parallel accordion pleats in an outer wall of the collector head extending in a longitudinal direction about the periphery of the collector head and turning upward at each end providing adaptibility for said collector head to physical features of said patient's mouth by both lateral and vertical flexing.

## 3,864,832
## THROW-AWAY TEETH PROTECTOR

Gunnar Olof Carlson, Eddagen 11, 182 63 Djursholm, Sweden

Filed Apr. 3, 1973, Ser. No. 347,365
Claims priority, application Sweden, Apr. 5, 1972, 4367/72
Int. Cl. A61c 11/00
U.S. Cl. 32—40 R 6 Claims



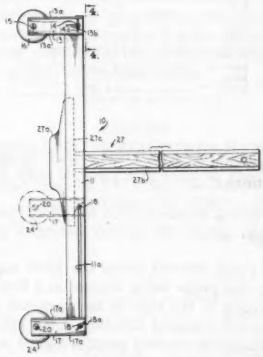
1. A throw-away teeth protector for use during medical incisions and treatments, comprising:

an arcuate base member formed of an elastic material, said base member having a substantially channel-shaped cross section with the inside wall thereof being higher than the outside wall and wherein the bottom of the channel on the outside is provided with protrusions which are spaced apart to form a free space between the base member of a protector applied on one jaw and the teeth of the opposite jaw, the bottom protrusions being positioned unsymmetrically with respect to the symmetry axis in the plane of the base member so that the bottom protrusions are displaced with regard to each other when two identical teeth protectors are used simultaneously in both jaws, the ends of the channel being open and a string of plastic material being positioned in the arcuate channel inside the ends of said base member, said string being plastic and elastic and non-curing at room temperature and said string having a free surface which is adapted to be forced against the points of the teeth to be protected, when the protector is to be used, so that the teeth are embedded at least partially in the plastic material, the plastic material being maintained plastic and non-curing in use.

## 3,864,833
## DRAFTING DEVICE

Harold L. Bokelman, 532 E. Poplar, Olathe, Kans. 66061

Filed Dec. 17, 1973, Ser. No. 425,157
Int. Cl. B43l 7/02
U.S. Cl. 33—76 R 2 Claims



1. Removably attachable means for guiding a T-square across a flat work surface comprising, in combination:

an elongate, straight, beam member L-shaped in transverse section thereby to have a first portion thereof positionable substantially parallel to said flat working surface and a second portion thereof simultaneously positionable at substantial right angles to said working surface,

a leg at one end of the beam member fixed to and extending at right angles to the first portion thereof and of sufficient length to space upwardly the beam member from a working surface and a sufficient distance that the rule of a conventional T-square may slide under the second portion of said beam member without contacting same,

a pair of mounting arms pivotably secured to the first portion of said beam member, one adjacent each end thereof and fixable at substantial right angles to the longitudinal axis thereof,

one of said mounting arms transversely adjustable of said beam member, this adjustment provided by virtue of a slot formed in the said mounting arm,

the other of said mounting arms longitudinally adjustable of said beam member, said adjustability achieved by virtue of an elongate slot formed in the first portion of said beam member, said slot extending substantially parallel to the longitudinal axis of the beam member, and

means on each of said mounting arms for removably securing same to said working surface, said securing means of length substantially that of the leg at the end of the beam member,

whereby to permit removable fixing of both said beam member and mounting arms as a U-shaped frame to said

working surface, with the second portion of said beam member at substantial right angles to said surface, thereby to receive (inverted) the working head of a conventional T-square in sliding abutment there against with the elongate ruler of the T-square extending under the said second portion of the beam member at right angles thereto.

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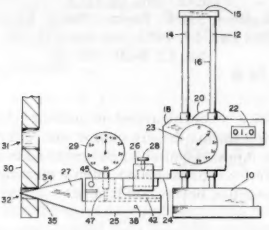
**3,864,834**

## AUTOMATIC CENTERING HEIGHT GAUGE ATTACHMENT

**Herbert C. Horton, 866 N. Prior Ave., St. Paul, Minn. 55104**

**Filed Mar. 4, 1974, Ser. No. 448,535**
**Int. Cl. G01b 5/14**
**U.S. Cl. 33—169 R** **8 Claims**



**1.** An attachment to be used with a height gauge for measuring the locations of holes in a piece of stock comprising in combination:

a housing having means thereon to connect said housing to the height gauge and further having a pivot support therein;

a tapered probe pivoted about the pivot support in said housing, said probe being tapered at a first end so as to be insertable in the hole to be measured and having a pivot support engaging structure at the other end, and a linear distance measuring gauge mounted in said housing so as to bear against said probe at a point between the first end and the other end.

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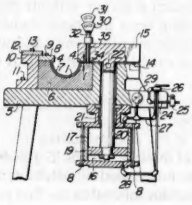
**3,864,835**

## DEVICE FOR MEASURING THE INTERFERENCES AND THE INCLINATIONS OF ABUTTING SURFACES OF A HALF PLAIN BEARING

**Nobukazu Morisaki, Aichi-ken, Japan, assignor to Daido Metal Company, Ltd., Kita-ku, Nagoya, Japan**

**Filed June 6, 1974, Ser. No. 477,049**
**Int. Cl. G01b 3/56**
**U.S. Cl. 33—174 E** **10 Claims**



**1.** A device for measuring the interferences and the inclinations of abutting surfaces of a half plain bearing comprising a bearing half piece supporting body having a receiving surface identical with the bearing half piece case of said half plain bearing and adapted to receive a bearing half piece of said half plain bearing, a supporting bed adapted to fix and support said bearing half piece supporting body, a stopper means which is provided on said bearing half piece supporting body and engages one abutting surface of said bearing half piece received on said receiving surface so that said one abutting surface is placed in a fixed positional relation with said bearing half piece supporting body, an abutting surface pressing means arranges such that said abutting surface pressing means is supported at one point thereon by a fulcrum means disposed on said supporting bed and extends over the other abutting surface of said bearing half piece to be in contact with and supported by said other abutting surface, a loading means having a piston shaft and adapted to apply a load to said abutting surface pressing means in which the end of said piston shaft is connected to said pressing means through a joint means which makes said pressing means swingable about each of two straight lines crossing at right angles to each other on a horizontal plane and which is adapted to operate in such a manner that with the movement of said piston shaft the portion of said pressing means extending over said other abutting surface comes into full contact with said other abutting surface and apply the load to said other abutting surface to compress said other abutting surface while inclining in accordance with the inclination of said other abutting surface, and a pair of dimension measuring instruments which are provided on said abutting surface pressing means and are adapted to measure the interference of said bearing half piece at their measuring positions spaced from each other in the axial direction of said bearing half piece.

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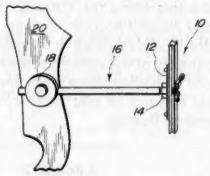
**3,864,836**

## VERNIER BOW SIGHT

**James R. Haines, 1217 Tonti St., La Salle, Ill. 61301**

**Filed Aug. 24, 1973, Ser. No. 391,207**
**Int. Cl. F41g 1/00; F41b 5/00**
**U.S. Cl. 33—265** **9 Claims**



**1.** A bowsight having a sighting element adjustably mounted on the bow for range and windage adjustment comprising:

a. a range bar,

b. an auxiliary member slidably mounted on the range bar and carrying the sighting element in vertical slidable relation along the range bar,

c. a main member in slidable relation along the range bar spaced from the auxiliary member,

d. a lock screw for locking the main member in fixed relation along the range bar,

e. a first elastic force member connecting the auxiliary member and the main member and exerting a force therebetween in the direction of sliding,

f. a first retention member of adjustable length connecting the auxiliary member and the main member and exerting a force therebetween in the direction of sliding, said force acting in opposition to the force exerted by the elastic force member so that the position of the auxiliary member along the range bar can be adjusted,

g. a windage sight element support bar for carrying the sight element at one end thereof having a non-circular cross-section and moving transversely relative to and engaging the auxiliary member through a working clearance hole having a similar non-circular cross-section therein,

h. a second elastic force member connecting the auxiliary member and the other end of the non-circular support bar

opposite the sight element thereon and exerting a force therebetween in the direction of moving, and

i. a second retention member having an adjustable position along said sight element support bar for exerting a reaction force against said auxiliary member in equilibrium against said elastic force.

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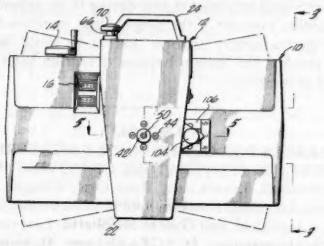
**3,864,837**

**MOUNTING ASSEMBLY FOR A LIGHT BEAM GENERATOR**

**Rudolph S. Myeress, Richmond Heights, Ohio, assignor to Allied Steel & Tractor Products, Incorporated, Cleveland, Ohio**

**Filed Nov. 1, 1973, Ser. No. 411,750**
**Int. Cl. G01c** *15/00*
**U.S. Cl. 33—299** **14 Claims**



**1.** A mounting assembly for a variable elevation light beam generator said light beam generator having a housing, comprising:

a support structure to which the light beam generator is pivotally mounted;

an orientation reference member pivotally mounted to said support structure about an axis coincident with the pivot axis of the light beam generator, said orientation reference member being adjustably fixed relative to said support structure to define an orientation reference position; means mounted on said orientation reference member for sensing the orientation of said orientation reference member with respect to true level; and

biasing means mounted partially on said orientation reference member and partially on the light beam generator housing for adjustably fixing the light beam generator relative to said orientation reference member to increase the effective range of elevations available with the variable elevation light beam generator.

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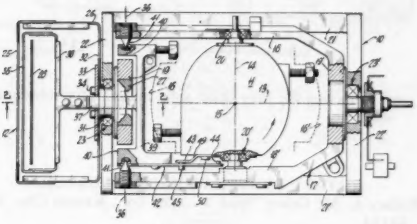
**3,864,838**

**ARTIFICIAL-HORIZON GYROSCOPE**

**Frederick J. Owens, and Jerry B. Bishop, both of Wichita, Kans.**

**Filed Mar. 8, 1971, Ser. No. 122,055**
**Int. Cl. G01c** *19/44*
**U.S. Cl. 33—329** **14 Claims**

**1.** An artificial horizon gyroscope, comprising a frame, an attitude gimbal and roll-axis bearing means supporting said gimbal on a roll axis in said frame, said bearing means having a generally central passageway therethrough, display means including roll-indicating means connected via said bearing means to indicate motion of said gimbal in roll, a gyro rotor assembly and bearing means supporting the same on a pitch axis in said gimbal, said display means including pitch-indicating means having a pitch-transmitting linkage connection to said rotor assembly via the passageway in said roll-axis bearing means, said linkage including a transmitting arm pivotally supported by said gimbal on a pivot axis located between said pitch-axis bearing means and the passageway of said roll-axis bearing means, said arm extending through the passageway and supporting said pitch-indicating means, the opening of said passageway being such in relation to size and location of said arm as to permit pivoted movement of said arm through a range of direct pitch-transmitting connection to said rotor assembly corresponding at least to a limited pitch



range, and said linkage including lost-motion connecting means operative to position said transmitting arm and said pitch-indicating means in accordance with pitch motion of said gimbal within said limited pitch range and to hold a maximum displaced position of said pitch-indicating means for gimbal-pitch motion beyond said range.

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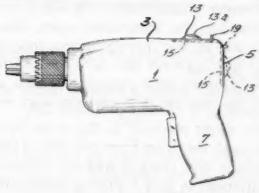
**3,864,839**

**DIRECTIONAL GUIDE FOR POWER HAND DRILL**

**Lloyd J. Wolf, Rt. 1, Box 45, Roanoke, Tex. 76262**

**Filed June 14, 1973, Ser. No. 369,924**
**Int. Cl. G01c** *9/28, 9/36*
**U.S. Cl. 33—334** **3 Claims**



**1.** The combination including a power hand drill having a housing with its top wall generally parallel to the drill axis and its near end wall generally normal to the drill axis, a spirit level of the circular bubble type, and means for selectively securing said level to said drill parallel to and normal to the drill axis said selective securing means comprising a plate mounting said spirit level to form a low-profile assembly and a pair of slots along each of the top and rear end walls of said housing parallel to and normal to the drill axis respectively for alternately slidably receiving opposite edges of said plate.

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**3,864,840**

**LYOPHILIC WASTE DISPOSAL**

**Steven I. Baskin, East Lansing, Mich., assignor to Donnell R. Matthews, Jr., Lansing, Mich.**

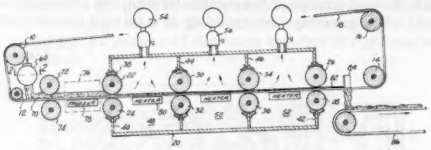
**Filed July 16, 1973, Ser. No. 379,242**
**Int. Cl. F26b** *5/06*
**U.S. Cl. 34—5** **25 Claims**

**1.** The method of treating wet sewage containing solid pieces which comprises

compacting the mass of wet solid pieces into a thin continuous layer,

freezing the layer,

subjecting the layer in a substantial vacuum to mild heating to vaporize by sublimation all of the liquids therein,



and collecting the fully dried solid material for subsequent use.

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**3,864,841**

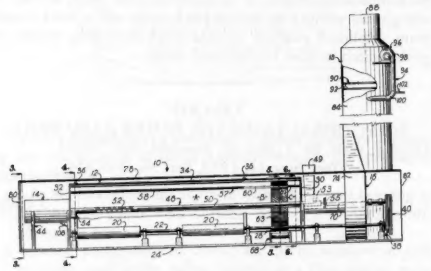
**ROTARY DEHYDRATOR-GRANULATOR**

**Wallace L. Mc Gehee, 1004 W. 88th Ter., Kansas City, Mo. 64114**

**Division of Ser. No. 298,952, Oct. 19, 1972, Pat. No. 3,792,536. This application Oct. 25, 1973, Ser. No. 409,729**

**Int. Cl. F26b** *7/00*

**U.S. Cl. 34—11** **4 Claims**



1. A method of dehydrating and granulating moist materials including the steps of:

tumbling material within a rotating drum while subjecting the material to a current of heated air;

adding new moist material to the drum by conveying the same through the drum from one end of the latter toward the opposite end thereof without subjecting the newly added material to said tumbling action while it is being conveyed;

collecting partially dehydrated and granulated material within the newly added material throughout the full length of conveyance of the latter;

mixing partially dehydrated and granulated material with that newly added simultaneously with said collection and conveyance over the full length of such conveyance;

discharging the mixture into the stream of tumbling material; and

removing material which has become suitably dehydrated and granulated from the drum.

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**3,864,842**

**METHOD AND APPARATUS FOR DRYING CONTINUOUS SHEETS**

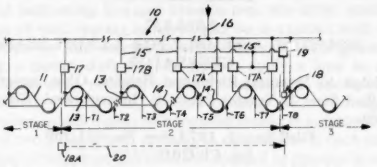
**Willard C. Sawyer, Oxford, Maine, assignor to Gorham International Inc., Gorham, Maine**

**Filed Apr. 9, 1973, Ser. No. 348,934**

**Int. Cl. F26b** *13/08*

**U.S. Cl. 34—41** **15 Claims**

1. The method of drying a wet sheet that comprises the steps of conveying the sheet along a path with both surfaces in contact with rotatable, steam-heated drums establishing drum temperatures such that at the outfeed end, the sheet has a desired moisture content and during said drying has a zone where its moisture content becomes critical between an infeed zone where the drying rate is constant and an outfeed zone where the drying rate is falling, monitoring the sheet to determine whether in that zone the moisture content of at least one margin of the sheet is critical in that its moisture content is bound water and the intermediate portion still contains free water, and then, if such a difference in moisture content is



detected, reducing the temperature of drums in the outfeed end of the zone of constant rate drying to an extent such that the moisture content of the sheet in the monitored zone becomes approximately uniform thereby to avoid defects that would result if the margin became overdried before the free water was removed.

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**3,864,843**

**APPARATUS FOR CONTINUOUSLY MEASURING THE SURFACE TEMPERATURE OF MOVING WEBS**

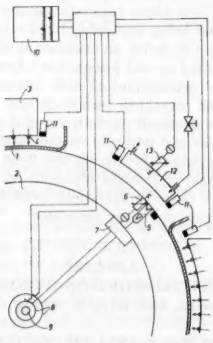
**Peter Herzhoff, Leverkusen; Hans Gref, Cologne; Wolfgang Schweicher; Hans Frenken, both of Leverkusen; Josef Friedsam, Langenfeld, and Gunter Meinhardt, Leverkusen, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany**

**No Drawing. Filed Mar. 9, 1973, Ser. No. 339,708**

**Claims priority, application Germany, Mar. 14, 1972, 22122276**

**Int. Cl. G01k** *13/08*; **G01j** *5/18*

**U.S. Cl. 34—43** **6 Claims**



1. An apparatus for continuously measuring the residual moisture in moving webs during the process of drying in which the web is carried upon the circumferential surface of a wheel rotating about a shaft and is moved successively under a plurality of jets of drying air directed onto the web along the peripheral path of the drying wheel, comprising a radiation pyrometer mounted within and adjacent the circumference of the wheel and directed toward the inner side of the web for measuring the temperature of a surface element of the web when passing through the drier, an air-temperature sensor mounted adjacent the rim of the wheel for measuring the temperature of the drying air ejected from successive nozzles along the drying path, means connecting said radiation pyrometer and air temperature sensor to sliding contacts at the shaft,

a recording device, and sliding contacts at the shaft connecting the radiating pyrometer said air-temperature sensor to the recording device for transmitting the electrical signals produced by the radiation pyrometer and the air-temperature to the recording device and wherein the recorder has a moving element corresponding to the drying wheel, traversing means being connected to the moving element for providing a time-coordinated record of the temperature readings obtained by the radiating pyrometer and air temperature sensor, and the traversing means being synchronized with the drying wheel whereby a temperature record coordinated with each rotation of the wheel is obtained.

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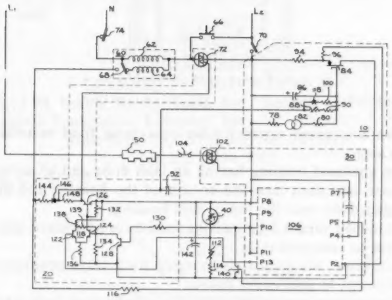
**3,864,844**

## SOLID STATE DRYER CONTROL

**Donald S. Heidtmann, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Oct. 26, 1973, Ser. No. 409,908**
**Int. Cl. F26b** *19/00*
**U.S. Cl. 34—45** **4 Claims**



**1.** In a fabric dryer of the type having a rotatable drum for tumbling fabrics and including heating means and drive means for rotating said drum, solid-state means for controlling the operating of said dryer comprising:

first sensing means including a moisture sensor, charging capacitor and switch for detecting the moisture content of fabrics disposed within said dryer, said first sensing means producing a signal when said moisture content has declined to a predetermined value;

transducer means for sensing the temperature within said dryer and producing a signal repesentative thereof;

first control means including a zero-voltage switch for receiving said signals produced by said first sensing means and said transducer means, said first control means regulating the operation of said heating means in response to signals received from said transducer means, said first control means further including a first gated bilateral switch for controlling current flow to said heating means and acting to de-energize said heating means upon reception of said signal produced by said first sensing means; and

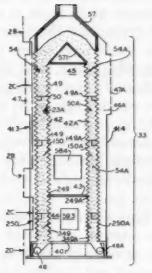
second control means including voltage-level sensing trigger means for receiving said signals produced by said first sensing means and said transducer means, said second control means including a second gated bilateral switch for controlling current flow to said drive means and acting to terminate the operation of said drive means upon reception of signals from both said first sensing means and said transducer means.

**3,864,845**

## GRAIN DRYING PROCESS AND SYSTEM AND APPARATUS THEREFOR

**Robert P Cooper, Rt. 1, Box 151, Amarillo, Tex. 79106**

**Filed Nov. 19, 1973, Ser. No. 416,739**
**Int. Cl. F26b** *17/12*
**U.S. Cl. 34—171** **4 Claims**



**1.** In a grain drier comprising a plurality of grain columns, each of said grain columns comprising an interior vertical perforated grid and an exterior perforated vertical grid parallel thereto with a space therebetween through which grain is moved, a hot air space between the interior grids of said columns, a heater and a fan assembly connected to said hot air space, said grids including perforations sufficiently large to allow air to pass therethrough freely and small enough to retain grain therein, a grain feeding means at the top of each of said columns and a discharge means at the bottom of each said column, the improvement which comprises a plurality of like grain distribution units in each column adjacent said hot air space, one such like grain distribution vertically above the other, each such grain distribution unit extending from its front edge adjacent to the interior grid of one of such grain columns to its rear edge at the exterior grid of said grain column, each said distribution unit comprising six firmly joined together rigid panels all impervious to said grain as follows:

a.

i. a first flat rigid panel sloped in a downwardly and first sideways direction, said first sideways direction extending in a first vertical transverse plane, said first flat panel being sloped in said first direction at an angle to the horizontal greater than the angle of repose of said grain and said first panel having a straight horizontal bottom edge and a straight horizontal top edge parallel thereto, and parallel straight sideways and downwardly sloped front and rear edges, each such first panel front and rear edge being perpendicular to said top and bottom edges of said first panel;

b.

i. a second flat rigid panel sloped downwardly in a second, forward, direction, said second direction extending in a second vertical plane transverse to said first vertical plane,

ii. said second panel having a straight top horizontal edge and a straight horizontal bottom edge parallel thereto and parallel straight downwardly and forwardly sloped left and right side edges, each side edge perpendicular to said top and bottom edges of said second panel;

iii. said top horizontal edge of said second panel being located in the same flat vertical plane as the rear edge of said first panel and the bottom edge of the second panel is at a vertical height which is above the intersection of a straight line extension in the plane of the rear edge of the first panel and plane of the first panel rear edge with the vertical plane in which the right edge of said second panel lies, and the top horizontal edge of

said second panel is at a vertical height no higher than the level at which a straight line intersecting the top edge of the first panel and lying in the flat vertical plane including said top edge of said second panel, and which straight line is at an angle to the horizontal equal to the angle of repose of said grain, intersects the vertical plane in which the right edge of said second panel lies;

c.

i. a third flat panel sloped in a downwardly and third sideways direction at an angle in excess of the angle of repose of the grain, said third direction extending in a third vertical transverse plane parallel to said first vertical transverse plane, said third flat panel being downwardly sloped in said third direction at an angle to the horizontal which angle is the same in amount as the angle to the horizontal exhibited by said first flat panel;

ii. said third panel having a straight horizontal bottom edge and a straight horizontal top edge parallel thereto and having parallel straight sloped front and rear edges, each said front and rear edge being perpendicular to said top and bottom edges of said third panel;

iii. said bottom edge of said third panel being colinear with the bottom edge of the first panel, said top edge of said first panel and the top edge of said third panel being co-planar on the same horizontal plane, the right hand side edge of the second panel and the top edge of said third panel lying in the same flat vertical plane;

d.

i. a fourth rigid flat panel sloped downwardly in a fourth, rearward, direction, said fourth direction extending in a fourth vertical plane transverse to said first and third vertical planes;

ii. said fourth panel having a straight top horizontal edge and a straight horizontal bottom edge parallel thereto and parallel rearwardly sloped left and right side edges, each said side edge perpendicular to said top and bottom edges of said fourth panel;

iii. said bottom edge of said fourth panel and said bottom edge of said second panel being parallel to each other and co-linear, said top horizontal edge of said fourth panel being located in the same flat horizontal plane as the top horizontal edge of the second panel and in the same vertical plane as the front edge of the third panel and said top edge of said fourth panel extending leftward of a vertical plane in which the bottom edge of the first and third panel lies by the same amount as the top horizontal edge of the second panel extends to the right thereof;

e. a fifth vertical triangular panel having a top edge and two adjoined bottom edges and a bottom vertex, the top edge extending from and firmly joined to the front end of the top edge of the first panel and the rear end of the top edge of the third panel and one of the side edges of said fifth panel is firmly attached to and extends from said front end of the top edge of the first panel along the front edge of the first panel to said bottom vertex and the other side edge of the fifth panel extends from said bottom vertex along the rear side edge of the third panel to the top edge of said third panel, said bottom edges being firmly joined to said side edges along the length thereof and in fixed position relative thereto;

f. a sixth vertical rigid panel having a top edge, a front vertical edge and a rear vertical edge and front and rear sloped bottom edges, said top edge being straight and in firm contact with and joined to the bottom edges of the first and third panels, the front edge of the sixth panel extending vertically from the front end of the bottom edge of the third panel to the right hand end of the top edge of the fourth panel and the rear edge of the sixth panel extending vertically from the rear end of the bottom edge of the first panel to the left end of the top edge of the second panel, and the bottom rear sloped edge of the sixth panel being firmly joined to the left side edge of the second panel and the bottom front edge of the sixth panel being firmly joined to the right hand side edge of the fourth panel.

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**3,864,846**

## AUTOMATED STEAMING APPARATUS

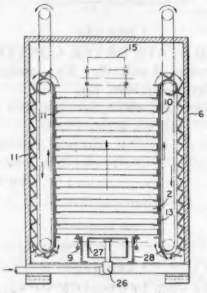
**Torahiko Hayashi, 2-3, Nozawa-cho, Utsunomiya, Japan**

**Filed Sept. 11, 1972, Ser. No. 288,141**

**Claims priority, application Japan, Sept. 11, 1971, 46-70508**

**Int. Cl. F26b *11/18***

**U.S. Cl. 34—189** **2 Claims**




1. An automated apparatus for processing food material, comprising,

a. an enclosed housing having an inlet door and an outlet door, one door near the bottom of the housing and the other door near the top of said housing,

b. conveyor means for receiving food trays positioned adjacent to said inlet door,

c. conveyor means for discharging food trays positioned adjacent to said outlet door,

d. a conveyor means for vertically transporting food trays positioned between said receiving and said discharging conveyor means and comprising at least a pair of vertical chain conveyors disposed adjacent to opposite inner walls of said housing,

e. a plurality of L-shaped bars mounted on said vertical chain conveyors,

f. said L-shaped bars being connected to the links of said chain conveyors by means of pins about which said L-shaped bars are rotatable,

g. one arm of each L-shaped bar being adapted to support a tray for food material in cooperation with an opposing bar on the other chain conveyor,

h. the other arm of said L-shaped bar slideably engaging a rail mounted along the inner passage of each of the chain conveyors,

i. whereby each of said bars, upon leaving said inner passage, rotate about said pin until said tray supporting arm of said L-shaped bar forms an angle other than a right angle with a vertical plane, thereby reducing the horizontal distance between said pin and the outermost end of said L-shaped bar.

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**3,864,847**

## NAIL POLISH DRYER

**Fred Friedman, and Gertrude Friedman, both of 557 Golf Terrace Dr., Union, N.J. 07083**

**Filed June 20, 1974, Ser. No. 481,246**

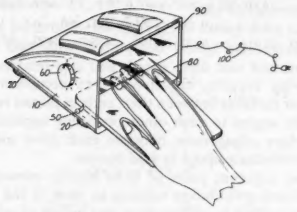
**Int. Cl. F26b *19/00***

**U.S. Cl. 34—202** **4 Claims**

1. A nail polish dryer comprising:

a horizontally disposed tray, the tray being mounted in a manner that it is free to slide forwardly and rearwardly in a horizontal plane;

a plurality of heat sources, the heat sources being disposed forward of and above the tray, in a position that sliding the tray forwardly places the tray in a position where the tray will be exposed to the heat produced by the heat sources; and



means cooperating with the said tray and heat sources, the means causing the heat sources to be energized when the tray is in its forward position and causing the heat sources to be deenergized when the tray is in its rearward position.

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**3,864,848**

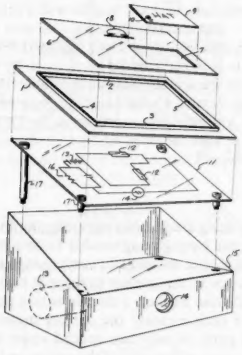
**LEARNER FEEDBACK DEVICE**

**Harry M. Smith, Battleground, Ind., assignor to Purdue Research Foundation, Lafayette, Ind.**

**Filed Sept. 13, 1973, Ser. No. 397,019**

**Int. Cl. G09b** *5/02*

**U.S. Cl. 35—9 D** **11 Claims**



**1.** A learning feedback device comprising

a display board adapted to receive logic means and one or more symbol bearing means on the surface thereof;

at least one symbol bearing means sized for emplacement on said display board, said symbol bearing means including at least one magnet;

said logic means disposed in electrically non-contacting relationship with said symbol bearing means;

electric circuit means influenced by said magnet to become electrically conductive while remaining electrically isolated from said symbol bearing means upon a predetermined correct emplacement of said symbol bearing means in relation to said logic means;

an electrically actuated signal device connected in said electrical circuit means;

and power supply means connected in said electrical circuit means and adapted to actuate said signal device upon said electrical circuit means becoming conductive.

**3,864,849**

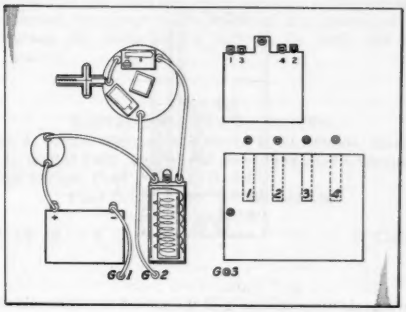
**EDUCATIONAL DEVICE FOR LEARNING IGNITION SYSTEM FUNDAMENTALS**

**Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 345,920, March 29, 1973,. This application Oct. 12, 1973, Ser. No. 405,972**

**Int. Cl. G09b** *25/02*

**U.S. Cl. 35—13** **8 Claims**




**1.** An educational kit for teaching the assembly, relationship of parts, and operation of an automotive ignition system comprising:

a. a simulator board having a surface of magnetically attractive material and including graphic indicia on the surface thereof defining schematic diagrams of the outlines of various of the component parts of an automotive ignition system in its unconnected state, said board further having mounted thereon in association with said indicia a plurality of jack members for forming simulated electrical connections between various of said schematic diagrams;

b. a plurality of magnetically attractive manipulative pieces individually bearing on their surfaces specific graphic indicia defining specific elements of the component parts for an automotive ignition system or descriptive word indicia;

c. a plurality of plug wires each adapted for connecting two of said jack members; and

d. audiovisual instructional means; said manipulative pieces and plug wires adapted for manipulation on the simulator board and in association with the simulator board indicia by the user in response to said instructional means such that the assembly, relationship of parts, and operation of an automotive ignition system can be graphically and physically simulated, said magnetically attractive board or alternatively each of said magnetically attractive pieces being magnetic to provide a mutual attraction between said board and said pieces.

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**3,864,850**

**TEACHING AID**

**August Philip Helmecke, Massapequa, L. I., N.Y., assignor to Crocker Country Day School, Inc., Oceanside, N.Y.**

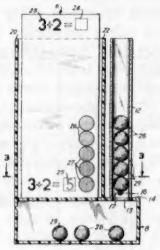
**Filed July 11, 1973, Ser. No. 378,353**

**Int. Cl. G09b** *19/02*

**U.S. Cl. 35—31 R** **7 Claims**

**1.** In a teaching device of the type which employs coded key cards and aids abstract learning through concrete application, the improvement comprising at least one key card bearing printed data and marked with a master code, said at least one key card being receivable in a card holder, said at least one key card including top and body portions, an abstract printed problem being located on said top portion thereof, a like abstract printed problem being located on said body portion thereof with an answer key thereto, at least a pair of color

coded subsets correlatable with said abstract printed problem located on a margin of said body portion of said at least one key card, a card holder for selectively displaying said at least one key card, said at least one key card being insertable therein, said card holder normally obscuring from view said body portion of said at least one key card and normally displaying said top portion of said at least one key card, said card holder including means for displaying said body portion of said at least one key card, as desired, and means for displaying at least a pair of companion color coded objects correlatable with said color codes subsets, said last mentioned means being aligned with said key card margin on which said color coded subsets are located.



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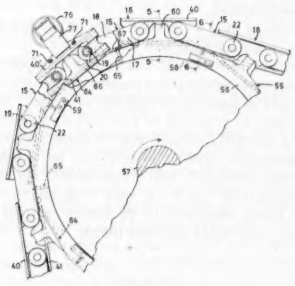
**3,864,851**

**DREDGE CHAIN, SPROCKET, AND COMBINATION**

**Ronald M. Guntert, 2402 Clarendon St., Stockton, Calif. 95204**

**Filed Sept. 4, 1973, Ser. No. 393,952**
**Int. Cl. E02f** *3/14*
**U.S. Cl. 37—69** **15 Claims**



1. A drag chain adapted for connection with the dredge buckets of an endless bucket-line floatingly suspended in a substantially vertical plane for movement of the chain longitudinally thereof, said chain comprising:

a. adjacent pairs of pivotally connected, elongated links in generally end to end relation, each adjacent pair comprising a drive link and an intermediate link;

b. each drive link having a pair of elongated spaced, opposed drive bars in side by side relation, and each intermediate link having a pair of elongated, spaced, opposed intermediate bars in side by side relation with each pair of drive bars disposed in a plane at a right angle to each pair of intermediate bars;

c. intermediate spools between the end portions of the intermediate bars of each intermediate link with ends respectively adjacent said intermediate bars, and drive spools between the end portions of the drive bars of each drive link with ends respectively adjacent said drive bars and one of the drive spools at one of the ends of each drive link of said adjacent pairs of links extending between the intermediate spools at the end portions of each intermediate link;

d. said drive spools being rigid with said drive bars, and said intermediate spools being rigid with said intermediate bars, and said drive spools and said intermediate spools having arcuate, concavo-convex complementary outer wear surfaces between their ends in planes respectively at right angles to each other providing approximately 180° surface engagement between each drive spool and each intermediate spool in said planes;

e. said adjacent pairs of links having substantially unrestricted articulation relative to each in the plane of the chain when in endless form and means of said drive spool providing a predetermined degree of articulation between adjacent links laterally relative to said last mentioned plane.

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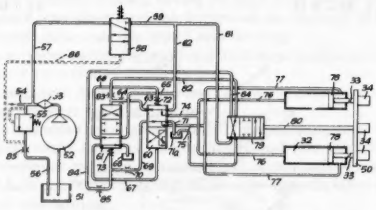
**3,864,852**

**HYDRAULIC OSCILLATOR FOR DIGGING BUCKET TEETH**

**Leonard Marshall Lochrie, Salisbury, England, assignor to BTR Industries Limited, London, England**

**Filed Mar. 27, 1973, Ser. No. 345,355**
**Int. Cl. E02f** *3/40, 9/22;* **F01l** *25/02*
**U.S. Cl. 37—141 R** **12 Claims**

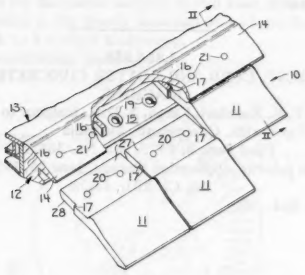


1. An excavating device having a digging bucket provided with a mouth and having reciprocable cutting means mounted on at least one side of the mouth, comprising means for applying a steady force to the bucket to force it into material to be excavated to fill the bucket, a double acting piston and cylinder device for reciprocating the cutting means, the cylinder having outlet ports at only two spaced apart locations along the cylinder one on either side of the piston and two inlet ports nearer the ends of the cylinder respectively than the outlet ports, first valve means for controlling fluid flow to the cylinder, said valve means reciprocating the piston under normal working conditions in the region between the two outlet ports as said valve means are movable between a first condition in which one of said inlet ports and one of said outlet ports on the opposite side of the piston are open and the other of said inlet and outlet ports are closed, and a second condition in which said other inlet port and said other outlet port are open and said one inlet port and said one outlet port are closed, whereby when the piston drifts in either axial direction from said region the piston at least partly covers said one or said other of the outlet ports so that the fluid flow out of that outlet port is throttled thereby increasing the pressure of fluid in the cylinder on the same side of the piston as that outlet port to resist further movement of the piston in the same direction, and hydraulic oscillator means separate from said piston and cylinder device is provided for oscillating said first valve means between its first and second conditions.

## 3,864,853
## QUICK DISCONNECT CUTTING EDGE FOR EARTHWORKING IMPLEMENTS

**Gene R. Klett, Joliet; Billy R. Bedford, Peoria, and Thomas P. Casey, Joliet, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 27, 1973, Ser. No. 355,203**
**Int. Cl. E02f** *3/76*
**U.S. Cl. 37—141 T** **7 Claims**



**1.** An earthworking implement disposed for movement along a longitudinal axis thereof comprising

a support defining a receptacle extending laterally relative to said axis, said support comprising spaced upper and lower support members and a plurality of laterally spaced webs secured between said support members to define a plurality of separate pockets in said receptacle,

a cutting edge comprising a plurality of individual cutting edge segments each having a mounting section disposed in a respective one of said pockets and a cutting section extending forwardly of said support, and

quick disconnect means detachably mounting the mounting section of each segment on said support comprising

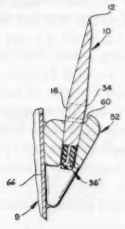
a pin disposed in axially aligned apertures formed through said support and said mounting section and

annular locking means mounted on said pin to frictionally engage outer surface portions thereof for preventing axial movement of said pin relative to said support.

## 3,864,854
## DIGGING TOOTH LOCKING DEVICE

**Clifford J. Evans, 5307 Bryce, Fort Worth, Tex. 76107**

**Filed Oct. 1, 1973, Ser. No. 401,984**
**Int. Cl. E02f** *9/28*
**U.S. Cl. 37—142 A** **12 Claims**



**1.** Locking device for releasably mounting a digging tooth within a tooth within a tooth receiving pocket of excavation equipment comprising, in combination:

a body of resilient material, said body having opposed wall surfaces, ribs formed on said opposed wall surfaces, a T-shaped cutout forming spaced co-extensive legs with each leg providing one of said opposed wall surfaces, the juncture of said legs forming a portion of said T-shaped cutout;

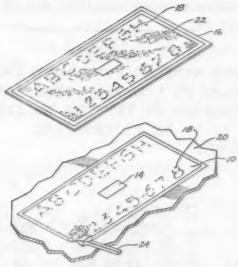
a digging tooth and a tooth mounting pocket; said tooth having a tip portion for engaging the earth and a wedge portion for engaging the pocket; opposed wells formed in a marginal free end portion of said wedge portion which causes said marginal free end portion of said wedge portion to be dovetail in cross-sectional configuration, said dovetail being of a size to be received within said T-shaped cutout,

so that said ribs, when said wedge portion is forced into said pocket, are compressibly deformed in a manner to increase the wedge action between the tooth and the pocket.

## 3,864,855
## DESTRUCTIBLE LABEL SYSTEM

**John A. Pekko, Whittier, and Wayne L. Richardson, Monrovia, both of Calif., assignors to Avery Products Corporation, San Marino, Calif.**

**Filed Dec. 8, 1969, Ser. No. 883,090**
**Int. Cl. G09f** *3/03*
**U.S. Cl. 40—2 R** **15 Claims**



**1.** A destructible label system comprising:

a. a fragile label base at least one surface of which is imprintable with visual indicia;

b. an adhesive layer having first adhesive surface for adhesive contact with the surface opposed to the imprintable surface of the fragile label base and a second adhesive surface for adhesive contact with at least one substrate, the adhesivity of the second adhesive surface to the substrate exceeding the tear strength of said fragile label base; and

c. a self-supporting film at least transparent where visual indicia are to appear on said fragile label base said self-supporting film dimensioned to cover said fragile label base in overlapping relationship and having an adhesive surface for contact with said fragile label base and the substrate a portion of the adhesive surface of said self-supporting film being substantially non-adhesive with respect to a portion of said fragile label base.

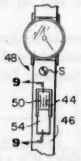
## 3,864,856
## EMERGENCY DATA BAND

**Richard J. McManus, Denver, Colo., assignor to Hi-Tor Inventions, Corporation, San Antonio, Tex.**

**Filed Sept. 5, 1972, Ser. No. 286,447**
**Int. Cl. G09f** *3/14*
**U.S. Cl. 40—21 C** **1 Claim**

**1.** A watchband structure comprising in combination a flexible strap adapted to be secured to a watch to form an enclosed loop for encircling the wrist of a user, said strap having a longitudinal compartment extending longitudinally of said strap, said compartment including overhanging longitudinal edges along opposite sides, an information card disposed within said compartment having emergency information re-

corded thereon, longitudinal lip members extending along opposite sides of said compartment for releasably retaining the information card in the compartment, an opaque cover for the compartment defined by generally rectangular slide plate means retained between said longitudinal edges and said longitudinal lip members for slidable movement in a lengthwise




direction along said flexible strap between an open and a closed position such that information recorded on the information card is exposed when the cover is open but is unexposed when the cover is closed, and finger-engaging handle means disposed at one end of said slide plate means to effect movement of said slide plate in a lengthwise direction along said flexible strap between said open and closed positions.

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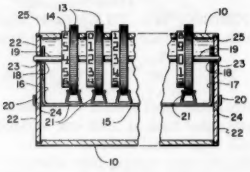
**3,864,857**

## TELEPHONE NUMBER RECORDED AND REMINDER

**Berton H. Brude, Rt. 1, Mankato, Minn. 56001**

**Filed Oct. 29, 1973, Ser. No. 410,792**
**Int. Cl. G09f** *11/02*
**U.S. Cl. 40—77.4** **3 Claims**




1. A telephone number indicating device adapted to be mounted to a telephone base comprising:

a. an elongated tubular housing including an elongated surface, said housing defining a plurality of openings in alignment with one another along the longitudinal length of said surface;

b. a shaft supported in said housing by means whereby it is held in parallel alignment with said openings;

c. U shaped bracket means having an elongated base portion, the opposed facing arms of said bracket defining openings for receiving said shaft;

d. a plurality of independently rotatable wheels mounted on said shaft, each of said wheels having integral first and second cylindrical portions with a common axis, said first wheel portion having a larger diameter than said second portion, the peripheral surface portion of each of said second portions of said wheels having number indicia thereon sequentially arranged about the circumference thereof;

e. U shaped spring members spaced along and mounted to the base portion of said U shaped bracket at intervals corresponding to the openings in the tubular housing surface, respectively, the opposed arm portions of each of said spring members being so shaped as to matingly engage, slidably and frictionally the opposite sides of respective rotatable wheel first portion to hold same in alignment with said openings, respectively, and against free rotation;

f. closure members for the ends of said tubular housing, said closure members defining shaft receiving openings positioned so that when the shaft is mounted therein and interior to said housing the first wheel portion of each of said wheels projects beyond its respective openings in said housing and said numbered indicia on the second portion of each said wheels is visible through their respective openings; and

g. means for restraining said U shaped bracket from rotating about said shaft when one of said wheels is rotated by an operator.

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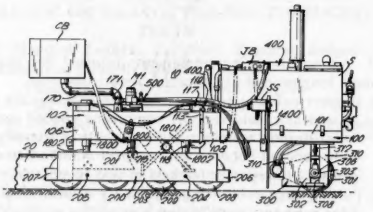
**3,864,858**

## PAVEMENT, CURB AND GUTTER CONCRETE LAYING MACHINE

**William P. K. Rochfort, Fargo, N. Dak., assignor to Kerbit Pty. Ltd., Townsville, Queensland, Australia**

**Filed June 8, 1973, Ser. No. 368,025**
**Claims priority, application Canada, June 16, 1972, 144917**
**Int. Cl. E01c** *11/28*
**U.S. Cl. 404—98** **14 Claims**



1. A machine for laying a plastic mixture such as concrete, asphalt or the like in a ribbon on a supporting surface as the machine travels forwardly over such surface, comprising:

a. a frame having a rigid front portion supported on a steerable front wheel assembly and a rear portion comprising a cross-beam secured to said front portion and a pair of longitudinally extending beams projecting rearwardly therefrom;

b. means adjustably mounting at least one of said longitudinally extending beams on said cross-beam for movement toward and away from the other in a direction transverse to the direction of travel of the machine;

c. a pair of wheel support assemblies supporting respective ones of said longitudinally extending beams and connected thereto by a vertical height adjusting mechanism;

d. an open bottom hopper secured to said rear frame portion;

e. a downwardly facing open bottom slip forming mold detachably secured to said hopper and extending rearwardly from the open bottom of said hopper;

f. a paddle assembly rotatably mounted in said hopper for rotation about an axis transverse to the direction of travel of the machine to agitate the mixture in the hopper and transfer the same therefrom through the open bottom into said mold; and

g. means for driving said paddle assembly.

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**3,864,859**

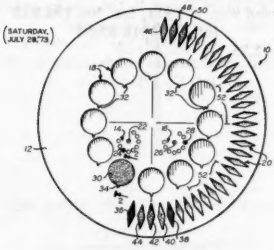
## PERPETUAL CALENDAR

**Len Kaufman, 500 Kappock St., Bronx, N.Y. 10463**

**Filed Aug. 6, 1973, Ser. No. 386,198**
**Int. Cl. G09d** *3/00*
**U.S. Cl. 40—107** **5 Claims**

1. A perpetual calendar requiring neither numbers, letters, words nor printed matter to be read, which comprises:

a planar base;
a decade-indicating marker;
means for locating and detachably affixing said decade-indicating marker selectively, within a first circular pattern on the planar surface of said base to correspond in position to the hourly markings on a clock dial from 1 o'clock to 9 o'clock inclusively;
a year-indicating marker;
means for locating and detachably affixing said year-indicating marker selectively, within a second circular pattern on the planar surface of said base to correspond in position to the hourly markings on a clock dial from 1 o'clock to 9 o'clock inclusively;
a month-indicating marker;




means for locating and detachably affixing said month-indicating marker selectively, within a third circular pattern on the planar surface of said base to correspond in position to the hourly markings on a clock dial from 1 o'clock to 12 o'clock inclusively;
seven day-indicating markers, visually distinguishable from each other; and
means for locating and detachably affixing said day-indicating markers selectively, within a fourth circular pattern on the planar surface of said base to correspond in position to the minute markings on a clock dial from 1 minute past the hour to 31 minutes past the hour inclusively,
whereby the relative location of each of said above markers, in combination, corresponds in position to the time display on a conventional clock dial with the composite display indicating a specific calendar date.

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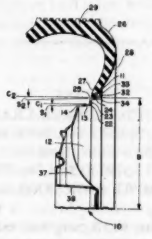
**3,864,860**
**TIRE DISPLAY APPARATUS**
**Leo A. Merzweiler, Bath, Ohio, assignor to Summit Plastic Corporation, Tallmadge, Ohio**
**Filed May 31, 1973, Ser. No. 365,473**
**Int. Cl. G09f** *21/04*
**U.S. Cl. 40—125 M** **6 Claims**



1. A display for mounting on tires of the type having a toroidal shape with a crown portion, sidewalls extending radially inward from the crown portion and terminating in bead portions surrounding a central opening, comprising a first annular flange extending axially of the display, a first rim joined to said first flange and extending radially outward to a second annular flange extending axially away from said first rim, a second rim joined to said second annular flange at a position spaced from said first rim and extending radially outward, said first annular flange having a diameter substantially the same as the diameter of the bead portions of a first size tire for insertion into the central opening of said first size tire, said first rim having an outer diameter greater than the diameter of the bead portions to restrict insertion of said first flange into the opening, said second annular flange having a diameter substantially the same as the diameter of the bead portions of a second size tire for insertion into the central opening of the tire, said second rim having an outer diameter greater than the diameter of the bead portions of said second size tire to overlap the surface of the bead portions and restrict insertion of said second flange into the opening whereby said display may be mounted on said first size tire or said second size tire.

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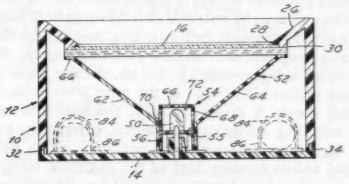
**3,864,861**
**ILLUMINATED DISPLAY DEVICE**
**Richard H. Hill, Jr., 20173 Hull St., Detroit, Mich. 48203**
**Filed Sept. 21, 1973, Ser. No. 399,385**
**Int. Cl. G09f** *13/14*
**U.S. Cl. 40—132 R** **6 Claims**



1. An illuminated indicia device comprising a continuous elongated frame of rectangular configuration, a base and a transparent cover plate forming a closed housing, a lamp mounted on said base within said housing an elongated first reflector mounted on said base within said housing around said lamp, said first reflector including four inclined side walls having reflecting surfaces, each of said side walls extending upwardly and outwardly from said base towards said cover plate and said frame respectively, with the upper edges of said side walls terminating in an outwardly turned continuous rim which is located near but spaced from said cover plate, an elongated second reflector opened at its ends mounted in said first reflector and extending across said lamp, said second reflector including a top panel and a pair of parallel side panels, each of said panels having light transmitting areas provided therein, said top panel being spaced from and extending across the top of said lamp and said side panels being spaced apart and extending along the opposite sides of said lamp, said reflectors being made from an opaque material, a transparent reflector cover mounted on said rim of said first reflector adjacent said cover plate, indicia mounted on said reflector cover, said reflector cover and said indicia occupying the space between said rim and said cover plate, and means for connecting said lamp to a source of current for energizing same, the light rays from said lamp when energized being emitted from the open ends of said second reflector and from said light transmitting areas provided in said panels and thereafter impinging upon and being reflected by the side walls of said first reflector to illuminate said cover plate and said indicia.

## 3,864,862
## FIREARMS

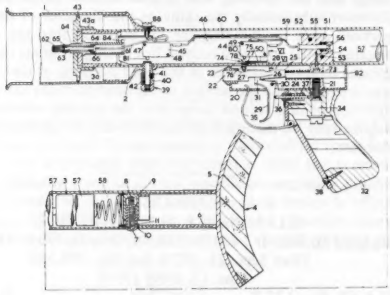
**William Ernest Brunger, Maidstone; Stanley Gordon Madden, Salisbury, and Benjamin Robinson Sawyer, Cheshunt, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain, London, England**

**Filed June 15, 1973, Ser. No. 370,293**

**Claims priority, application Great Britain, June 15, 1972, 28063/72**

**Int. Cl. F41c** *19/12, 27/06*

**U.S. Cl. 42—84** **8 Claims**



1. A firearm which is held in both hands for firing having an electrical firing circuit which includes first and second spaced-apart hand operated switching means which are so positioned on the firearm as to be operable only by using both hands, one hand operating the said first switching means and the other hand operating the said second switching means, the said firing circuit being arranged to fire the firearm when the first switching means is operated at the same time as the second switching means is being operated, the said first switching means including a tripping mechanism, a trigger by means of which the tripping mechanism is actuable and an associated electrical switch forming part of the electrical firing circuit and arranged to be momentarily closed by said tripping mechanism when the latter is actuated by operation of the trigger.

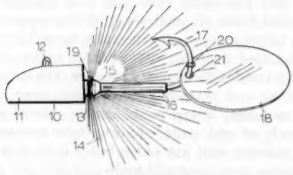
## 3,864,863
## FISH LURE

**Donald C. Neal, 1303 Pa. Ave. East, Warren, Pa. 16365**

**Filed June 30, 1972, Ser. No. 268,031**

**Int. Cl. A01k** *93/00*

**U.S. Cl. 43—42.15** **1 Claim**



1. An artificial fish lure comprising
a weighted head,
a single blade,
a barbed hook,
said head having an eyelet fixed thereon on the side of said head adjacent said hook,
an attracting means,
said hook having a tube disposed around it adjacent said head,
a grommet around said hook spaced from said tube,
said blade having a hole therein, said hook passing through said hole and said blade being disposed between said tube and said grommet,
said weighted head and said hook being fixed together,
said blade being generally oval in shape and having an area substantially larger than the cross sectional area of said said,
said head having a weight at least twice the weight of said blade,
said blade imparts a wriggling action to the lure without causing the entire lure to rotate, to attract fish.

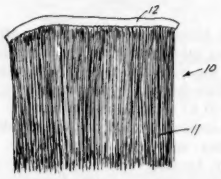
## 3,864,864
## FISHING LURE COMPONENT

**Margie F. Duescher, St. Paul, Minn., assignor to FisHair Incorporated, St. Paul, Minn.**

**Filed Nov. 2, 1971, Ser. No. 194,933**

**Int. Cl. A01k** *85/08*

**U.S. Cl. 43—42.25** **1 Claim**



1. An article of commerce, for future use as a plurality of fishing lure components, comprising:
a bundle of synthetic thermoplastic hair whose strands lie in a generally common direction, said strands having a narrow common bond of the hair at only one end thereof of such thickness to comprise a brittle fusion of the ends of only synthetic hair, said fusion being elongated transversely to said common direction and being manually fracturable in said common direction to provide individual lure components each having a selected quantity of hair at least temporarily supported only by the fusion.

## 3,864,865
## FLAT BUTT TAPERED LEADER

**Rolla Douglas Swisher, Spirit Lake, Iowa, assignor to Berkley & Company, Inc., Spirit Lake, Iowa**

**Filed July 13, 1973, Ser. No. 378,919**

**Int. Cl. A01k** *91/00*

**U.S. Cl. 43—44.98** **7 Claims**

1. A fly line leader having a progressive taper along with a progressively reduced mass from butt-to-tip and including a tapered tippet segment of generally circular cross section, a tapered butt segment of generally elliptical cross section and having a substantially constant minor axis dimension, and a

tapered transition segment of generally circular cross section extending between said tippet and butt segments and having

a rate of taper greater than that of said tippet and butt segments.

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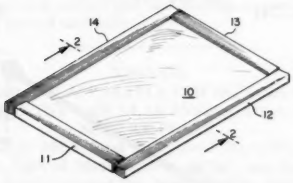
**3,864,866**
**PEST CONTROL DEVICE**
**Nathan Kosinsky, 70 Batteny Ave., Brooklyn, N.Y. 11228**
**Filed Nov. 9, 1973, Ser. No. 414,549**
**Int. Cl. A01m** *23/00*
**U.S. Cl. 43—58** **2 Claims**




**1.** A pest control device comprising:
a first rigid rectangular panel;
a non-drying adhesive disposed on one surface of said panel;
a second rigid rectangular panel substantially the same size as said first panel and disposed over said first panel and in contact with the adhesive surface;
a rigid U-shaped plastic strip having opposed lateral surfaces coupled to each of the common edges of said panels, the surfaces of said strips having a spring-like force to urge the common panel edges together in sealing relationship so as to prevent the adhesive from leaking from the panels.

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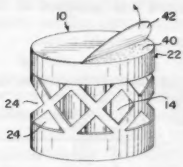
**3,864,867**
**PEST CONTROL PACKAGE**
**Clinton H. Dry, 1244 Juniper Ave., Redwood City, Calif.**
**Filed Nov. 1, 1973, Ser. No. 411,661**
**Int. Cl. A01m** *1/20, 25/00*
**U.S. Cl. 43—131** **7 Claims**

**1.** A package for use in controlling pests within a area which comprises a container of generally tubular form and having end closures, one of which is removable and replaceable, said container having apertures in at least one wall thereof providing access to the interior, and a replaceable cartridge of pest control material which is in a solid state enclosed within said container with the outer side wall of said cartridge spaced from the inner side wall of said container, and cooperating




male and female members in the container and cartridge ends constituting means for holding said cartridge in a relatively fixed position in said container.

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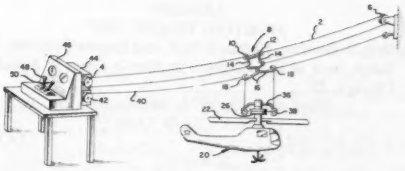
**3,864,868**
**HELICOPTER TOY**
**Tobin Wolf, 285 Aycrigg Ave., Passaic, N.J. 07055**
**Filed June 6, 1973, Ser. No. 367,535**
**Int. Cl. A63h** *27/12*
**U.S. Cl. 46—1 H** **23 Claims**




**1.** An amusement device comprising,
movable track means suspended between two spaced points, a traversing member supported by said track means for movement therewith,
a toy helicopter provided with a horizontal rotor,
a flexible line extending generally parallel to the track means,
means on the traversing member for movably supporting spaced portions of the line,
means on the helicopter engageable by the portion of the flexible line intermediate the spaced portions for suspending the helicopter and training the line against the rotor for rotating it during movement of the traversing member with the track means.

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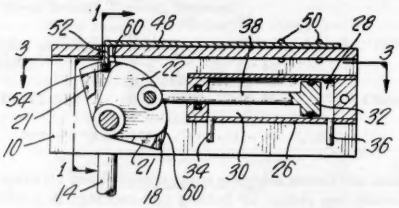
**3,864,869**
**ROTATABLE OBJECT WITH POSITIVE LOCK AND MEANS TO UNLOCK AND ROTATE SAID OBJECT**
**Urs Leuenberger, Fontevrault, Quebec, Canada, assignor to Canada Wire and Cable Limited, Toronto, Ontario, Canada**
**Filed Apr. 16, 1973, Ser. No. 351,597**
**Int. Cl. A63h** *27/00*
**U.S. Cl. 46—78** **12 Claims**

**1.** A positive lock rotating linkage comprising:
a. a supporting structure;
b. a first segment, means mounting said first segment for rotation on said supporting structure, and an object secured on said first segment to be rotated back and forth by a predetermined angle;
c. means located on said supporting structure for locking said first segment at each extreme position of its angular motion against angular rotation in both directions; and
d. a second segment, means mounting said second segment for rotation on said supporting structure coaxially and independently of said first segment, said second segment

including means for coacting with said locking means to unlock said first segment at each extreme position of its angular motion and for subsequently rotating said first segment through said predetermined angle, said segments being constructed and arranged to allow said second




segment a predetermined amount of free angular motion relative to said first segment before unlocking the first segment and subsequently rotating said first segment at each extreme position of its angular motion so as to render said first segment independent of the exact positioning of said second segment in the lock position.

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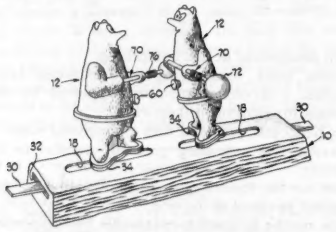
**3,864,870**

## FIGHTING FIGURE TOY

**Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Aug. 27, 1973, Ser. No. 391,792**
**Int. Cl. A63h *13/06***
**U.S. Cl. 46—142** **11 Claims**




1. A fighting game comprising: a base and at least two figures above said base; a plurality of means, one for each figure, mounting the associated figure for compound movement on the base and including a slide mounted for reciprocal movement on the base, each said slide journalling a spur gear for rotation about a substantially vertical axis, each said figure being secured to the associated spur gear for rotation about said substantially vertical axis therewith, each said slide further pivotally mounting an operator having a gripping portion and an opposed gear portion in mesh with the associated spur gear whereby rotation of said gripping portion will cause rotation of the associated figure and reciprocation of said gripping portion will cause reciprocation of the corresponding figure; a plurality of means, one for each of said figures, mounting the associated figure for further movement between a substantially upright position and a substantially prone position relative to the base; means for normally biasing each figure towards said prone position; latching means operative to hold each figure in its normally upright position; and operating means for said latch means for unlatching said latching means to allow each figure to move to its substantially prone position; each figure including means adapted to contact the operating means of the latching means of the other figure to cause the other figure to move from said substantially upright position to said prone position.

**3,864,871**

## HAND MANIPULATABLE FIGURE TOY

**Bette M. Kaelin, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**

**Filed Aug. 3, 1973, Ser. No. 385,350**
**Int. Cl. A63h *3/14***
**U.S. Cl. 46—154** **4 Claims**

1. A hand manipulatable figure toy comprising: flexible material having two sides and being formed in a generally dome-like reversible configuration having an opening large enough to receive a hand into the interior of the dome, wherein one side of said dome has a design thereon depicting an animal and including appendages attached to said one side whereby the toy with said one side out can be used as a puppet, and the other side of said dome has indicia thereon defining another form of the toy which can be exposed to view by turning the dome with said other side out to change the form of the toy.

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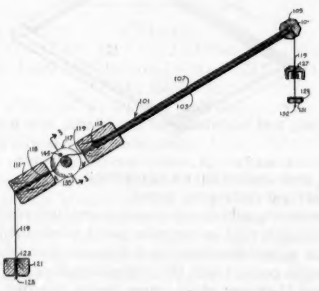
**3,864,872**

## FISHING GAME

**John H. Hoetzel, 650 Americana Ave., Annapolis, Md. 21403**

**Filed Feb. 21, 1973, Ser. No. 334,428**
**Int. Cl. A63h *33/26***
**U.S. Cl. 46—241** **12 Claims**



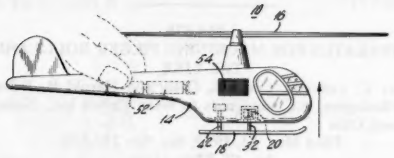
1. A toy for picking up objects comprising:
a. a pair of rods,
b. a common handle on one end of said rods and joining said rods thereto at said one end, the other ends of said rods being slightly spaced from each other,
c. a line ppssing through each of said rods and at least a portion of said handle,
d. means on the end of each of said lines remote from said handle for picking up an object,
e. a pair of independently operable means associated with said handle and connected to respective lines for pulling each of said lines substantially through said respective rods, said pulling means being closely adjacent each other so that a child can coordinate the pulling of one line with the pulling of the other line to assist in the improvement of eye-hand cordination and manual dexterity.

3,864,873

## TOY WITH AUTOMATICALLY ACTUATED SPEAKER BOX

Jasper Watkins, P.O. Box 94, Clifton, N.J. 07015

Filed Dec. 26, 1973, Ser. No. 428,110
Int. Cl. A63h 27/12
U.S. Cl. 46—232 5 Claims



1. A toy adapted for simulated airborne flight and intended to be selectively raised and lowered with respect to a surface; said toy comprising:

a body;

sensing means movably mounted with respect to said body between first and second positions in response to said body being raised from and lowered onto said surface, respectively;

prerecorded message means for presenting a first preselected message in response to said sensing means moving to its said first position;

biasing means for biasing said sensing means toward its said first position, said biasing means including a landing-support element secured to said body and normally biased away therefrom, one end of said sensing means being secured to said landing-support element; and

normally closed circuit means to energize said message means, the other end of said sensing means maintaining said circuit means in an open condition when said body lands on said surface and said landing-support element is urged toward said body.

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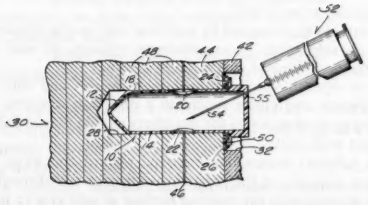
3,864,874

## METHOD AND APPARATUS FOR INTRODUCING A FLUID INTO THE VASCULAR SYSTEM OF A TREE OR SIMILAR PLANT

Dale M. Norris, 101 S. Rock Rd.; John F. Reynolds, 109 Richland Ln., both of Madison, Wis. 53705, and Raymond L. Carroll, 4305 Crawford Dr., Madison, Wis. 53711

Filed Jan. 29, 1973, Ser. No. 327,496
Int. Cl. A01g 7/06
U.S. Cl. 47—57.5 1 Claim



1. A method of introducing a treatment fluid into the vascular system of a tree comprising the following steps:

a. drilling and countersinking a cylindrical hole in the trunk of a tree, said countersink drilled through the bark of the tree to the phloem layer of the tree;

b. inserting a cylindrical implant capsule into the hole, said capsule having an annular shoulder formed at one end thereof and a gasket member mounted on the capsule adjacent said annular shoulder, said gasket upon installation becoming seated in the countersunk portion of the hole, said capsule being closed at both ends and having at least one opening in the cylindrical side wall portion thereof positioned in communication with the sap stream of the tree, said cylindrical hole drilled in the tree having a diameter slightly smaller than the outside diameter of the capsule to produce a friction fit between the capsule and the wall of the hole; and

c. introducing a treatment fluid into the implant capsule by puncturing the exposed end of the capsule to make a small opening therein and then inserting a tubular member through said small opening and injecting the treatment fluid therethrough into the capsule, said small opening located in the upper portion of the exposed end of the capsule.

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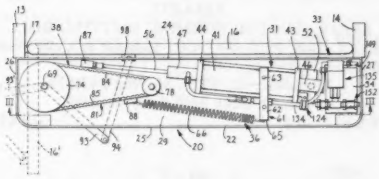
3,864,875

## SWING DOOR OPERATOR

Lew V. Hewitt, Corpus Christi, Tex., assignor to Overhead Door Corporation, Dallas, Tex.

Filed Apr. 16, 1973, Ser. No. 351,460
Int. Cl. E05f 17/00, 15/04
U.S. Cl. 49—115 26 Claims



1. In a door operator for a door movable between an opened position and a closed position, the combination comprising:

a flexible endless loop member and door drive shaft means direct driven in opposite directions thereby for opening and closing said door;

motor means engaging a reach of said endless loop member and actuable for moving said endless loop member in one orbital direction;

return means also engaging a reach of said endless loop member and responsive to disabling of said motor means for closing said door through moving said endless loop member in the opposite orbital direction;

whereby said motor means and return means oppositely orbit said endless loop member to move said door between open and closed positions.

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3,864,876

## FIXTURE FOR A BLAST CLEANING MACHINE

Philip H. Diehn, Mishawaka, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

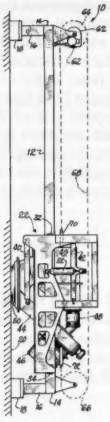
Filed Apr. 15, 1974, Ser. No. 461,030
Int. Cl. B24c 3/06
U.S. Cl. 51—9 M 11 Claims

1. A portable device for movably securing a blast cleaning machine to a ferromagnetic surface comprising:

a. a rectangular frame;

b. electromagnetic means on said frame for releasably securing said frame to said surface;

c. a carriage movable on said frame; and
d. means for linking said blast cleaning machine to said



carriage for movement therewith and for maintaining said machine in intimate contact with said surface.

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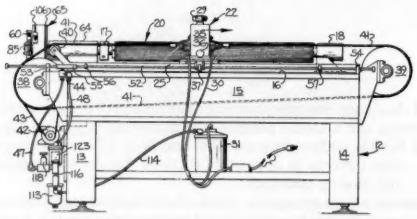
**3,864,877**

**APPARATUS FOR FORMING SLITTING ROLL**

**Brendan L. Doll, Patterson, N.C., assignor to Cellu Products Company, Patterson, N.C.**

**Filed Mar. 22, 1973, Ser. No. 343,679**
**Int. Cl. B24b** *19/02, 47/10, 3/00*
**U.S. Cl. 51—34 F** **18 Claims**



1. An apparatus for forming a plurality of axially directed ribs on the peripheral surface of a cylindrical hard surfaced roll or the like and comprising
a frame defining a central axis,
means for rotatably mounting the roll on said frame coaxially with said central axis,
means including a rotatable machining wheel for removing material from the peripheral surface of the roll when said wheel is brought into operative engagement therewith,
means for relatively longitudinally reciprocating said machining wheel and roll such that said wheel moves with respect to the roll in a linear path of travel extending parallel to said central axis and along and beyond said peripheral surface of the roll such that said machining wheel operatively engages the peripheral surface to form an axially directed channel therein during a first portion of its travel and is free of all contact with the roll during a second portion of its travel, and
means for periodically indexing the roll about said central axis a predetermined angle during the second portion of the travel of said machining wheel so that a plurality of adjacent parallel channels may be formed in the peripheral surface and with an axially directed rib being defined between each pair of channels, said indexing means including an indexing wheel rotatably carried on said frame and adapted to be operatively connected to the roll for concurrent rotation, and means for periodically rotating said indexing wheel a predetermined increment with respect to said frame during the second portion of travel of said machining wheel.

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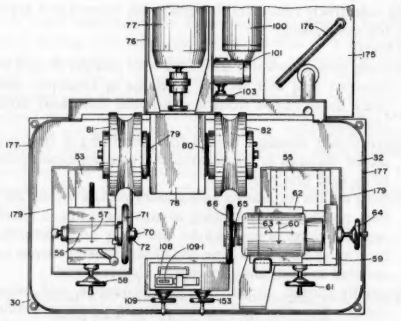
**3,864,878**

**APPARATUS FOR MACHINING PILGER ROLLS AND THE LIKE**

**Harry C. Ledebur, Canfield, Ohio, and Harold R. Wilson, Wilmington, N.C., assignors to Wean United Inc., Youngstown, Ohio**

**Filed Mar. 13, 1972, Ser. No. 233,920**
**Int. Cl. B24b** *17/02*
**U.S. Cl. 51—50 PC** **18 Claims**

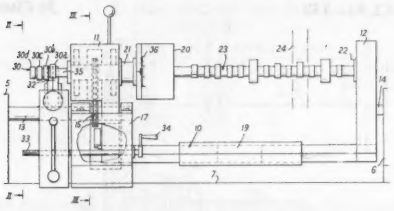


1. Apparatus for duplicating the contour of a non-uniform peripheral groove of a master roll in the periphery of a work roll, comprising:
a base,
shaft means rotatably carried by said base and supporting said master and work rolls,
motor means for driving said shaft means so that both rolls rotate at the same speed,
follower means cooperable with said master roll and cutter means cooperable with said work roll,
table means on which said follower and cutter means are mounted in fixed, spaced relation,
connection means between said table means and said base for supporting said table means for planar movement relative to said base,
a rotatable shaft carried by said base and having connection with said table means whereby rotation of said shaft effects shifting of said table in a plane,
means operable to urge said table means and thus said follower and cutter means in a direction whereby each engages respectively the periphery of said master roll and said work roll,
said follower means being moved toward and away from and laterally of the axis of said master roll through engagement with the contour surface of said groove in said master roll and translating such movement to said cutter means through said table means so that said cutter means duplicates such groove in said work roll,
said connection means between said table means and said base comprising a parallel linkage system which constrains said table means to orbital movement in its plane, whereby to maintain said follower and cutter means at a predetermined angle with respect to the axes of said master and work rolls, through the entire formation of the duplicate groove in said work roll.

## 3,864,879
## CAM GRINDING

William Dixon Naismith, 176 Arthur Rd., Wimbledon Park, London, S.W. 19, England

Filed Apr. 26, 1973, Ser. No. 354,745
Claims priority, application Great Britain, Apr. 26, 1972, 19363/72
Int. Cl. B24b *17/02, 7/00, 9/00*
U.S. Cl. 51—101 R 13 Claims



1. For use with a grinding machine having a bed, a grinding wheel having a rotation axis, a headstock and a tailstock with a headstock-tailstock axis; a cam grinding attachment comprising a frame having means for pivotal mounting between the headstock and tailstock of the grinding machine, workpiece holding means carried by the frame having means to carry a cam workpiece to be ground with its axis parallel to but eccentric from the headstock-tailstock axis, drive means coupled to the workpiece holding means to provide substantially continuous rotation of a workpiece carried therein, a master cam holding means coupled with the workpiece holding means having an axis coaxial with the axis of the workpiece and having means to carry a master cam, a first support member, a guide member pivotally mounted on the support member for pivotal movement about an axis parallel to the axis of the master cam holding means but eccentric therefrom and having a guide surface for engagement with a master cam, adjustment means coupled with the guide member whereby the guide member may be pivotally adjusted so that the guide surface registers with the grinding wheel surface in a plane joining the axes of rotation of the grinding wheel and a cam workpiece whereby in use the frame pivots about its mounting means to carry the workpiece towards or away from the grinding wheel in accordance with the master cam on rotation of the cam workpiece.

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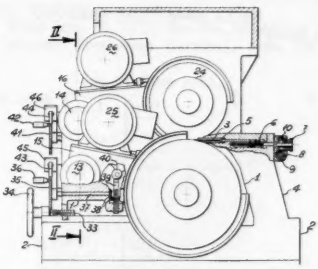
## 3,864,880
## BLADE SHARPENING APPARATUS

Silvio Repetto, Modena, Italy, assignor to S.p.A. Luigi Rizzi & Co., Modena, Italy

Filed May 3, 1973, Ser. No. 356,781
Claims priority, application Italy, May 12, 1972, 24245/72
Int. Cl. B24b *3/36, 19/00*
U.S. Cl. 51—247 7 Claims

1. An apparatus for sharpening the cutting edge of a blade, comprising the combination of

1. a support for the blade,
2. a carriage mounted for displacement horizontally in respect of the blade on the support and perpendicularly to the cutting edge of the blade,
3. means for displacing the carriage,
4. an upper and a lower arm pivotally mounted on the carriage for horizontal displacement therewith perpendicularly to the cutting edge of the blade,
5. two horizontal pivots extending substantially parallel to the cutting edge of the blade for pivotally supporting the two arms on the carriage,
6. **means for pivoting the arms in respective vertical places about the respective pivots,**
7. an upper and a lower grinding wheel respectively carried by a free end remote from the respective pivot of the upper and lower arm,
   a. the diameters and positions of the grinding wheels forming predetermined angles on opposed surfaces of the cutting edge of the blade, and



8. means for adjusting the upper arm in a horizontal direction relative to the carriage and perpendicularly to the cutting edge of the blade for varying the angle of the upper surface of the cutting edge relative to the angle of the lower surface of the cutting edge.

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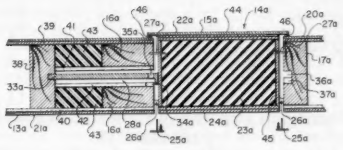
## 3,864,881
## BLOWOUT PANEL SYSTEM FOR BUILDING WALLS

Clarence P. Wolf, 1302 Willowwood Ct., Irving, Tex. 75060

Filed July 12, 1973, Ser. No. 378,528
Int. Cl. E05f *15/20*
U.S. Cl. 52—1 7 Claims



1. A blowout panel system for use in a building wall comprising:

frame members defining a blowout opening in said wall;

a blowout panel shaped and dimensioned to fill said opening, said panel having means establishing a peripheral flange larger than said opening on the exterior side of the panel, whereby to prevent displacement of the panel inwardly through said opening but permit displacement thereof outwardly from said opening;

a passageway extending from said opening through one of said frame members, said passageway being of a length substantially equal to the distance said opening extends along said frame member;

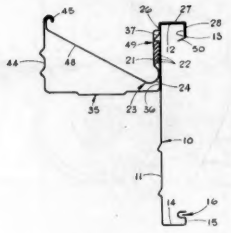
track means extending through said passageway at each end thereof, said track means extending along opposite sides of said opening and interiorly of said building wall adjacent said opening for a distance substantially twice the dimension of said opening in the direction of extension of said track means;

and an emergency closure sheet slidably mounted on and supported by said track means, said sheet being moveable along said track means from a position in the interior of said building wall adjacent said opening when said blowout panel is positioned in said opening to a position across said opening, thereby closing it, when said panel is displaced from said opening.

## 3,864,882
## GUTTER SUSPENSION MEANS

**Jack Edward Lasscock, Adelaide,South Australia, Australia, assignor to Stratco Metal Proprietary Limited, South Australia, Australia**

**Filed Sept. 26, 1973, Ser. No. 400,711**
**Claims priority, application Australia, Sept. 27, 1972, 607/72**
**Int. Cl. E04d** *13/00;* **E04b** *7/02*
**U.S. Cl. 52—11** **8 Claims**

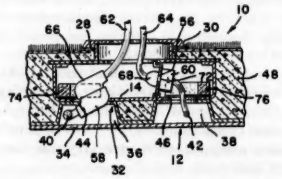


1. Gutter suspension means comprising in combination:
a gutter having a rear wall, tongue retention means comprising a longitudinally extending retention rib in the rear wall of the gutter near its upper edge, the retention rib projecting into the gutter,
a plurality of resilient clips each having a front portion depending into the gutter and at least portion of each said clip bearing against the front surface of said gutter rear wall,
there being a plurality of vertically-spaced gutter suspension points at which the gutter may be suspended by each said resilient clip, each gutter suspension point comprising a tongue on said front portion engageable with said tongue retention means, each said tongue sloping upwardly and rearwardly, said gutter suspension points being selectable so that the gutter fall is adjustable.

## 3,864,883
## METHOD AND APPARATUS FOR CLOSING A PASSAGEWAY

**Robert M. McMarlin, Murrysville, Pa., assignor to Pittsburgh Corning Corporation, Pittsburgh, Pa.**

**Filed Apr. 10, 1973, Ser. No. 349,767**
**Int. Cl. H02g** *3/08;* **E04f** *17/08*
**U.S. Cl. 52—221** **6 Claims**

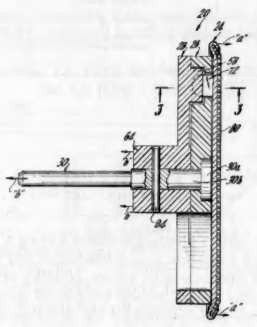


1. Apparatus for closing a passageway in an underfloor access housing comprising,
an underfloor access housing having a base portion with an inlet opening therein and a top portion having an outlet opening therein and a passageway connecting said inlet opening and said outlet opening,
a body of intumescent material positioned in said housing and having dimensions less than the internal dimensions of said underfloor access housing,
said body of intumescent material operable to foam and expand when said underfloor access housing is subjected to elevated temperatures and substantially fill said access housing and close said passageway therein.

## 3,864,884
## ABRADING TOOL AND HOLDER THEREFOR

**Bernard Weissman, 225 E. 48th St., New York, N.Y. 10017**

**Filed Sept. 14, 1973, Ser. No. 397,376**
**Int. Cl. B24b** *17/00*
**U.S. Cl. 51—358** **30 Claims**



1. A motor driven holder for a tool having an abrasive surface and at least one deformable tab, said holder comprising:
a. a retainer plate adjacent which the tool is adapted to be mounted, said retainer plate having at least one slot through a portion thereof for receiving the tab of the tool;
b. a support plate including deforming means located adjacent the slot in said retainer plate for distorting the tab therein and thereby preventing removal of the tab from the slot when the tool is in use, the tool being removable from said retainer plate when not in use by the application of a force to the tool whereby the tab is restored to at least approximately the original condition thereof prior to being distorted so that the tab is movable through the slot; and
c. means for coupling said retainer plate to said support plate while permitting relative displacement therebetween whereby when one of said plated is moved said deforming means will bend the tab into a position that prevents removal of the tool during usage.

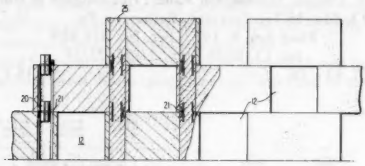
## 3,864,885
## WALL STRUCTURES

**George B. Muse, Calhoun, Ga.**

**Continuation-in-part of Ser. No. 802,450, Feb. 26, 1969, Pat. No. 3,609,926, which is a continuation-in-part of Ser. Nos. 658,524, Aug. 4, 1967, Pat. No. 3,479,782, which is a continuation-in-part of Ser. No. 730,727, May 21, 1968, abandoned. This application Jan. 2, 1970, Ser. No. 252**
**Int. Cl. E04b** *2/00, 5/46;* **E04c** *1/30*
**U.S. Cl. 52—259** **16 Claims**

1. A wall structure comprising a plurality of substantially identical rectangular building blocks each having substantially impervious planar side wall and end wall surfaces and planar top and bottom wall surfaces with the length of each block being four times its width, said blocks each defining a substantially vertical generally circular opening extending therethrough from its top wall to its bottom wall surfaces centrally in each end one-fourth portion thereof, said blocks being arranged in a series of horizontal courses of blocks with each block in each course of blocks being spaced from the next adjacent blocks in its course and having its planar top wall and bottom wall surfaces overlying and in abutment with the next

adjacent blocks in the courses of blocks next above and next below by one-fourth of its length at each of its ends and with the circular openings in each end one-fourth portion thereof being in alignment with the circular openings of its overlying blocks, radially expandable tubular inserts defining a slot from end-to-end positioned internally of said wall structure in at least some of said circular openings and extending between adjacent courses of blocks and expanded outwardly into engagement with the surfaces of said openings, columns of solidified cementitious substance at least partially filling some of said tubular inserts, the openings in the wall structure between the blocks in each course of blocks being substantially equal in size and shape and substantially equally spaced along the length of each course of blocks, and wall opening inserts positioned in at least some of said wall openings defined between the blocks in each course of blocks, said wall opening inserts being sized and shaped to substantially close said wall openings.



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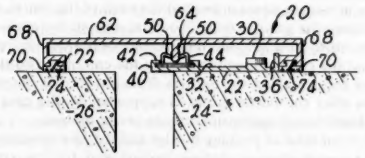
**3,864,886**

**COVER ASSEMBLY FOR STRUCTURAL JOINTS**

**Wenzel W. Thom, Wichita, Kans., assignor to Architectural Art Mfg., Inc., Wichita, Kans.**

**Filed Aug. 13, 1973, Ser. No. 387,708**
**Int. Cl. E04b** *1/68*
**U.S. Cl. 52—469** **30 Claims**




**1.** An assembly for complementally covering the open joint defined by a pair of elongated, spaced, adjacent, relatively shiftable structural members comprising:

base structure adapted to be fixedly secured to one of said structural members and presenting a section having an elongated, continuous channel substantially parallel to said joint and defined by a pair of spaced, substantially parallel, upstanding sidewalls, each of the latter being provided with an elongated, continuous, integral, inwardly extending lip along the top thereof;

yieldable connector means comprising a plurality of yieldable metallic spring clips positioned within said channel and spaced along the length thereof, said clips being of lesser transverse dimensions than the distance between said lips;

means for retaining said springs clips within said channel and permitting limited shifting and tilting therein by the spring clips;

cover means disposed in covering relationship to said spring clips and joint and having connection structure attached to the inner face thereof and extending therefrom into secure interlocking relationship with the underlying springs clips; and

support structure adapted to engage the other of said structural members for supporting the end of said cover means remote from said base structure.

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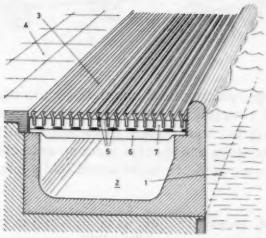
**3,864,887**

**GRATING**

**Erich Arens, Ewald-Rubsamen-Weg 4, 593 Huttental-Weidenau, Germany**

**Filed Sept. 10, 1973, Ser. No. 395,615**
**Claims priority, application Germany, Sept. 12, 1972, 2244661**
**Int. Cl. E04c** *2/42*
**U.S. Cl. 52—664** **7 Claims**




**7.** Grating for covering openings, wherein grate bars are held in spaced relationship by carrier bars extending transversely of their longitudinal direction, the grate bars (**5, 25**) consisting of profiled rails which have a laterally directed angled portion (**9**) above their fastening (**7, 27, 37**) to the carrier bars (**6, 26, 36**), the angled portions (**9**) of all the grate bars (**5, 25**) extending in the same direction, the angled portion (**9**) of the grate bars (**5, 25**) adjoining a foot portion (**8**) at an obtuse angle, the profiled rails constituting the grate bars (**5, 25**) having toothings (**11**) on the lateral surfaces of their foot portions (**8**), while linking pieces (**7, 27, 37**) fastened (**50, 51**) thereto have retaining slots (**13**) with correspondingly matched toothings (**12**), the toothings (**11, 12**) being capable of being positively latched to one another, the toothings (**11, 12**) having a saw-tooth profile, each tooth having one steep flank and one gently inclined flank, the steep flanks in the retaining slots (**13**) being directed towards the base of the slot and those on the foot portions (**8**) being directed away from the end of the foot,

characterized by the fact that the profiled rails constituting the grate bars (**5, 25**) are anchored by way of their foot portions (**8**) to said linking pieces (**7, 27, 37**) which rest positively by means of rearward retaining shoes on cutback ledges extending longitudinally of carrier bars (**6, 26, 36**).

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**3,864,888**

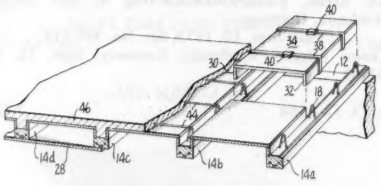
**APPARATUS AND METHOD FOR EMPLOYING GYPSUM BOARD AS FORMS FOR POURED CONCRETE CEILING AND FLOOR STRUCTURES**

**Burr E. Tupper, Oakland, Calif., and Luis Cejudo Alva, Edo De, Mexico, assignors to Kaiser Gypsum Company, Inc., Oakland, Calif.**

**Filed May 22, 1973, Ser. No. 362,800**
**Int. Cl. E04g** *21/00*
**U.S. Cl. 52—741** **2 Claims**

**1.** A method for forming a floor structure comprising the steps of providing at least two parallelly spaced beams having vertical abutments that define upward facing marginal shoulders thereon, providing first and second unitary gypsum board strips having a thickness corresponding to the width of the marginal shoulders, placing the strips on the respective shoulders with the strips in substantially vertical disposed relation, providing a unitary gypsum board sheet having a width corre-

sponding to the space between confronting vertical abutments of adjacent beams, placing the sheet on the upper edges of the strips so as to define, with said strips, an inverted channel-shaped configuration having a downwardly open concavity, supporting the medial region of the sheet with a transversely extending member contacting said sheet and the first and




second strips, placing fluid concrete on top of the sheet, permitting the concrete to cure, terminating the supporting step by removing the transversely extending member and leaving said gypsum strips and sheet in place so as to create an integral structure comprised of concrete and said gypsum board strips and sheet.

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**3,864,889**

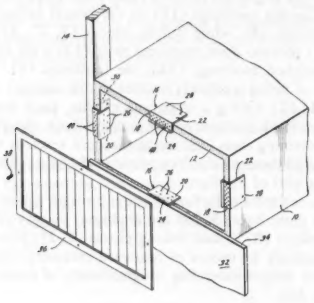
## DUCT-GRILLE CONNECTION CLIP

**James R. Hobbs, 5303 Glenmont, Houston, Tex. 77036**

**Division of Ser. No. 144,848, May 19, 1971, Pat. No. 3,827,209. This application Feb. 20, 1973, Ser. No. 333,900The portion of the term of this patent subsequent to Aug. 6, 1991, has been disclaimed.**

**Int. Cl. F16b** *5/06*

**U.S. Cl. 52—753 J** **5 Claims**



**1.** The improvement in a duct-grille connection clip including:

a multi-walled, elongate ventilation duct,

a clip arranged to slip over one wall of the duct at the end of the duct,

the clip having a generally rectangular flat face,

first and second parallel legs extending from the face and encompassing a portion of the duct wall, with the flat face adjacent the end of the duct wall,

a ledge forming an extension of the first leg and extending outwardly from the end of the duct,

the first leg slipped over the inside wall of the duct,

a wallboard panel covering the face of the clip and the exposed edge of the duct wall,

the panel abutting the ledge of the clip and resting against the face of the clip,

the extension of the ledge from the face being no greater than the thickness of the panel abutting the ledge,

a ventilation duct grille,

the grille fitting over and covering the panel covered end of the duct wall, and

threaded fastening means extending through the grille, panel and clip face and arranged to fasten the grille to the clip.

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**3,864,890**

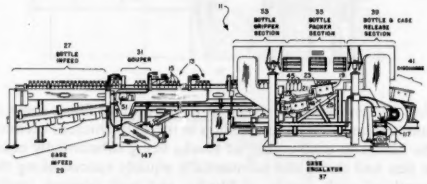
## BOTTLE PACKAGING MACHINE AND METHOD

**John E. Ullman, Huntingdon Valley, Pa., assignor to Huntingdon Industries Incorporated, Bethayres, Pa.**

**Filed Jan. 8, 1973, Ser. No. 321,959**

**Int. Cl. B65b** *5/06, 21/06, 21/18*

**U.S. Cl. 53—26** **16 Claims**



**1.** In a continuous-flow bottle packer machine for loading bottles and the like into empty cases and the like, said cases including leading and trailing endwalls connected by sidewalls and a bottom, bottle suspension means for suspending groups of bottles, suspended-bottle conveyor means for conveying said bottle suspension means and suspended-bottle groups into a bottle packer section, and feeding and loading means for feeding empty cases in a concurrent-flow converging path under said supsended-bottle groups into the bottle packer section and for loading each bottle group into a moving case by moving the case to envelop and support said bottle group, wherein the improvement comprises in said bottle suspension means, bottle gripper means for positively gripping each bottle firmly around the neck, means for moving said bottle gripper means into open position around the neck of the bottle, means for closing the gripper means to close around the neck of the bottle while said gripper means and bottle are in motion, without the gripper means touching the cap of the bottle, and means for releasing the bottles from the bottle suspension means after the bottle group is supported by the case while both bottles and suspension means are in motion.

**13.** A method of packing bottles and the like into cases and the like, said cases including leading and trailing endwalls connected by sidewalls and a bottom, comprising the steps of suspending groups of bottles, moving said suspended-bottle groups into a bottle packer zone, feeding empty cases in a concurrent-flow converging path under said suspended-bottle groups into the bottle packer zone, and moving each case to envelop and support a bottle group, wherein the improvement comprises positively gripping each bottle firmly around the neck without touching the cap of the bottle and gripping while the bottle is in motion, and releasing the suspension from the bottle group after it is supported by the case while the bottles are in motion.

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**3,864,891**

## MEAT PACKAGING AND PRESSING APPARATUS AND METHOD

**Ludwig Piereder, Pierrefonds, Quebec, Canada, assignor to A.B.R. Food Machinery (Canada) Limited, Dorval, P.Q., Canada**

**Filed Aug. 27, 1973, Ser. No. 391,863**

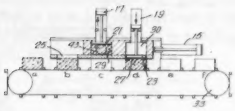
**Claims priority, application Canada, Sept. 1, 1973, 150853**

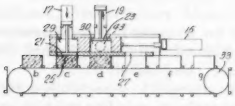
**Int. Cl. B65b** *5/04, 63/00*

**U.S. Cl. 53—35** **4 Claims**

**2.** Apparatus for packaging and pressing meat into a can or other container comprising:

a sliding assembly comprising a first and second cavity;
means for supporting cans to be filled beneath said cavities; said assembly further comprising first and second meat receiving openings in vertical portions thereof;
said first meat receiving opening communicating with said first cavity and said second meat receiving opening communicating with said second cavity;
said assembly further comprising first and second meat discharging openings in bottom horizontal portions thereof;
said first meat discharging opening communicating with said first cavity and said second meat discharging cavity communicating with said second cavity;
means for positively discharging meat through said first and second meat discharging openings into cans to be filled;





said sliding assembly being adapted to move in reciprocal motion over a platform;
said platform comprising an opening in a first position in a horizontal portion thereof and an opening in a second position in a further horizontal portion thereof;
said first and second positions being spaced from one another;
said platform further comprising an opening in a vertical portion thereof;
said opening in said vertical portion being adjacent a third position in said horizontal portion;
said third position being between said first and second positions; and
meat feeding means communicating with said opening in said vertical portion.

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**3,864,892**

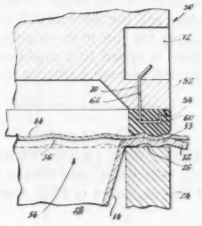
## AUTOMATIC PACKAGING METHOD AND APPARATUS WITH HEAT-SEALING ELEMENTS HAVING RESILIENT HEAT CONDUCTING MEMBERS

**Perry W. Molvar, Brooklyn, N.Y., assignor to Mahaffy & Harder Engineering Company, Totowa, N.J.**

**Filed May 29, 1973, Ser. No. 364,539**
**Int. Cl. B65b** *7/28, 51/14*
**U.S. Cl. 53—39** **8 Claims**

**1.** In automatic packaging apparatus of the type including means for supporting cup-shaped containers having peripheral flanges around the open mouths thereof; a sealing station; means for transporting said supported container into and through said sealing station; means for supplying to each container a sheet of material to serve as a top for the container; and means at said sealing station for heat-sealing the top to the container flanges to produce hermetically sealed packages, said heat-sealing means including first means to engage and support the under surface of the container flange during the heat-sealing operation;

that improvement of said packaging apparatus wherein the sealing station further comprises:
resilient means mounted for relative reciprocal movement towards and away from said first means and arranged to press the top and the adjacent portion of the cup flange together against said first means with at least a moderate degree of sealing pressure;
heat conducting means forming part of said resilient means to provide substantially enhanced conduction of heat through said resilient means to the engaged surface thereof pressed against said top;



the engaged surface of said resilient means being sufficiently flexible to conform under said sealing pressure to irregularities presented by the flange surface of the container and to effect a close, intimate, heat-transferring contact between said resilient means, said top, and said container flanges throughout a region extending entirely around said flanges; and
means to supply heat to said resilient means for conduction through said heat conducting means to raise said engaged surface to an elevated temperature, said heat supply means and said heat conduction means cooperating to supply through said resilient means all of the heat required to seal said top to said flanges and providing effective heat-sealing thereof.

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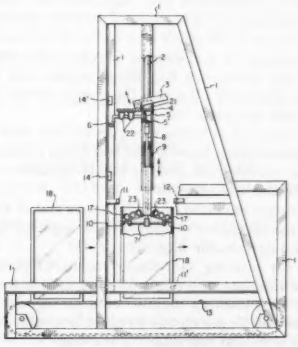
**3,864,893**

## AUTOMATIC BOBBIN LOADER

**Yoshio Murao, 55 Masuizumimati, Kanazawa, Japan**

**Filed Jan. 30, 1974, Ser. No. 437,863**
**Int. Cl. B65b** *57/10, 35/54*
**U.S. Cl. 53—59 R** **3 Claims**



**1.** Apparatus for automatically loading a bobbin box with bobbins comprising:
a vertically movable elevator plate;
a receiving plate for the bobbins having two parts pivotally attached to opposite sides of said elevator plate and adapted to fit within a bobbin box;

means for placing bobbins on said receiving plate;
means for raising and lowering said receiving plate and elevator plate into and out of said bobbin box;
a pin directly beneath the receiving plate for maintaining said receiving plate in a closed position whereby the bobbins remain on the receiving plate as the receiving plate is lowered into the bobbin box;
means for sensing when the bobbins on said receiving plate reach a predetermined level and causing said receiving plate to be lowered; and
means for rotating the pin in one direction when the receiving plate reaches a predetermined lower position in the bobbin box, whereby the weight of the bobbins opens the receiving plate and the bobbins fall into the bobbin box, and for rotating the pin to its original position when the receiving plate is raised to a predetermined upper position whereby the receiving plate is closed.

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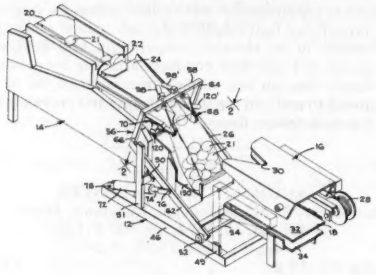
**3,864,894**

## APPARATUS FOR TRANSFERRING BAGS

**Charles E. Sheetz, Woodstock, and Wayne L. McClintic, Edinburg, both of Va., assignors to FMC Corporation, San Jose, Calif.**

**Filed May 4, 1973, Ser. No. 357,419**
**Int. Cl. B65b** *57/06, 43/28*
**U.S. Cl. 53—63** **24 Claims**



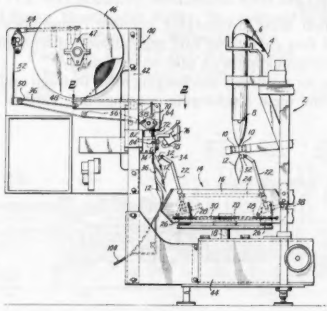
**6.** Apparatus for transferring a deformable bag along an arcuate path between a bag filling station and a bag tying station by releasably clamping the margin of the open end of the bag; said apparatus comprising:
a mounting arm movable along an arcuate path through an upright position between the bag filling station at one end of the arcuate path and the bag tying station at the other end of the arcuate path;
finger means mounted upon the upper end of the mounting arm for releasably clamping the margin of the open end of said deformable bag;
means for pivoting said finger means to permit them to move over the side edges of a bag at said bag filling station, said pivoting means being arranged to thereafter cause said finger means to move into clamping engagement with said side edges of the bag;
means for moving the mounting arm along the arcuate path; and
axle means disposed below said mounting arm for pivotally supporting said mounting arm whereby said deformable bag is arcuately moved by said moving means between the bag filling station and the bag tying station through the upright position.

**3,864,895**

## MULTI-PACK METHOD AND APPARATUS

**James C. Petrea, Durham, N.C., assignor to Wright Machinery Company, Inc., Durham, N.C.**

**Division of Ser. No. 335,935, Feb. 26, 1973,. This application Jan. 18, 1974, Ser. No. 434,822**
**Int. Cl. B65b** *35/30;* **B23q** *17/00*
**U.S. Cl. 53—159** **5 Claims**



**1.** Apparatus for grouping a desired number of bags of a product, which bags are sequentially formed, filled and sealed by a first machine, comprising:
transfer means arranged to sequentially grasp and hold bags as filled and sealed by said first machine and bodily carry them to position one end thereof at a securing station;
means for holding a backing sheet at said securing station; and
means operable in timed relation to said transfer means for securing said end of each bag to said backing sheet and thereafter releasing said bags from said transfer means.

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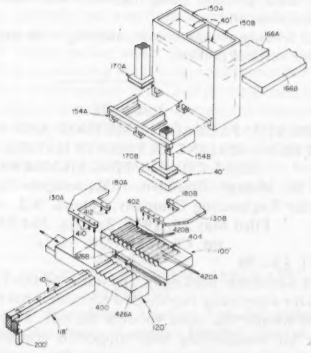
**3,864,896**

## ASSEMBLY APPARATUS

**David C. Bailey, Jr., Amesbury, Mass., assignor to The Gillette Company, Boston, Mass.**

**Filed June 29, 1973, Ser. No. 374,942**
**Int. Cl. B65b** *5/08, 35/40*
**U.S. Cl. 53—159** **18 Claims**



**1.** Apparatus for inserting a plurality of articles in corresponding compartments of a multi-compartment container, each said compartment having an open top and being separated from the adjacent compartment by a partition wall, comprising

first input means for serially feeding articles,
an assembly mechanism for receiving articles sequentially from said first input means and assembling said articles in spaced, aligned relation in a group,
a loading station having a platform
transfer mechanism for transferring said group of spaced, aligned articles from said assembly mechanism onto said platform,
second input means for transferring a container to said loading station, said second input means being operative to hold said container with the open top of each compartment in engagement with said platform so that the group of articles on said platform are partly inserted into corresponding compartments of said container,
an article insertion mechanism at said loading station, said insertion mechanism being operative to complete the insertion of said partly inserted articles into secured relation in their corresponding compartments,
and control means for operating said insertion mechanism to complete the insertion of said group of articles at said loading station into the compartments of said container while said second input means is holding a container in engagement with said platform.

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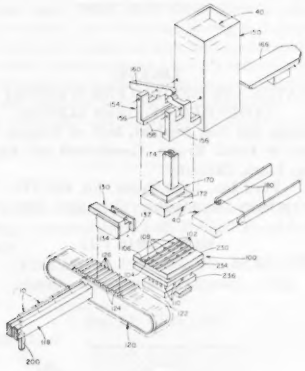
**3,864,897**
**LOADING APPARATUS**
**William F. Hitchcock, West Newbury, Mass., assignor to The Gillette Company, Boston, Mass.**
**Filed June 29, 1973, Ser. No. 374,900**
**Int. Cl. B65b** *35/40*
**U.S. Cl. 53—159** **20 Claims**



**19.** In apparatus for frictionally securing a plurality of articles such as razor blade units in corresponding compartments of a multi-compartment container comprising
first input means for feeding razor blade units in series relation,
an assembly mechanism for receiving razor blade units sequentially from said first input means and assembling said blade units in spaced, aligned relation in a group,
a loading station having a platform,
transfer mechanism for transferring said group of razor blade units from said assembly conveyor to said loading station,
said second input means for transferring a container to said loading station,
a blade unit insertion mechanism at said loading station, said insertion mechanism including a plurality of insertion pins that are mounted for vertical reciprocating movement and means for raising said insertion pins simultaneously to cam the blade units into their compartments with a rotary motion, each blade unit being free to slide laterally relative to the insertion pin that is driving it.

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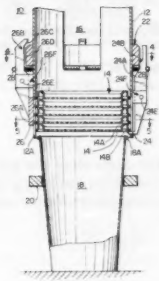
**3,864,898**
**AUTOMATIC CONTAINER CAPPING AND LID DISPENSING DEVICE**
**John Barth West, Glyndon, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.**
**Filed Aug. 21, 1973, Ser. No. 390,243**
**Int. Cl. B65b** *7/28*
**U.S. Cl. 53—328** **14 Claims**



**7.** Capping means for containers comprising:
magazine means holding a plurality of container lids in a substantially vertical stack with each said lid disposed substantially horizontally;
holding means for positioning an open mouthed container beneath said magazine means with the open mouth of said container in registry with said stack of lids;
bearing means mounting said magazine for reciprocation on its longitudinal axis toward and away from said holding means;
said lids and the mouth of said container having conformally shaped coacting rim structures to effect a force fit therebetween; and
lid retaining and release means cooperating with said magazine and synchronized with the reciprocations thereof releasing the lowermost lid in said stack and retaining the remainder of said lids therein as said magazine approaches said container and subsequently applying a substantially vertical force to said rim structure of said lowermost lid to effect said force fit of said lid to said container.

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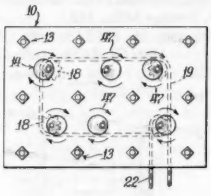
**3,864,899**
**SPINDLE FOR FRUIT PICKER**
**Fred D. Lasswell, 1111 N. Westshore Blvd., Tampa, Fla. 33607**
**Filed Aug. 20, 1973, Ser. No. 389,972**
**Int. Cl. A01g** *19/08*
**U.S. Cl. 56—328 R** **7 Claims**

**1.** A fruit harvesting panel comprising a plurality of tree penetrating spindles mounted in a certain arrangement on one side thereof, certain of said spindles being stationary, certain of said spindles being rotatable and widely spaced apart each of the rotating spindles having a cam mounted thereon constituting a fruit harvesting area, each of said cams comprising smooth cylindrical cammed surfaces arranged on said rotating spindles, means for rotating all of the rotatable spindles in one direction for alternatively forming between adjacent rotating spindles on the panel a wide and a narrow gap, whereby when the panel of spindles is inserted into a tree the arrangement of

spindles is such that fruit hanging in the area of the cams on the spindles will upon the spindles being rotated be pushed against and thereby gripped and gently twisted by the cooperation of the cylindrical cammed surfaces of two adjacent




rotating spindles as the cams close the gap between the spindles or engaged and twisted by the cooperative engagement of the cylindrical cammed surface of one rotating spindle and a stationary spindle.

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**Patent Not Issued For This Number**

**3,864,900**

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**3,864,901**
**WETTING MECHANISM FOR A TEXTILE YARN PROCESSING MACHINE**

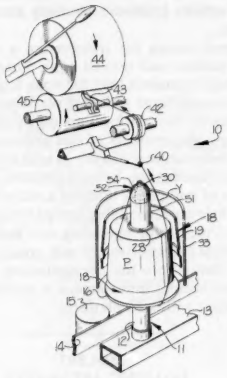
**Johannes Frentzel Beymes, Monchengladbach, and Christoph Quast, Moers, both of Germany, assignors to Palitex Project Company GmbH, Krefeld, Germany**

**Filed Oct. 18, 1973, Ser. No. 407,616**
**Claims priority, application Germany, Apr. 5, 1973, 2317053; Aug. 22, 1973, 2342284**
**Int. Cl. D01h** *1/10, 13/30*
**U.S. Cl. 57—35** **18 Claims**

1. In a textile yarn processing machine, such as a twister, spinning frame or the like, having a spindle assembly for the processing of yarn which includes a carrier mechanism having a carrier member for supporting thereon a hollow supply package of yarn to be processed and a hollow yarn entry tube carried within said carrier member and extending outwardly therefrom axially of the supply package supported thereon for receiving the yarn from the supply package and providing a passageway for the yarn therethrough for processing by said spindle assembly; the improvement of a non-flexible, yarn wetting mechanism carried by said carrier mechanism for applying a wetting agent to the yarn as it passes in its path of travel from the supply package for processing by said spindle assembly, said yarn wetting mechanism comprising:

a reservoir means carrying a supply of wetting agent; and

a porous, firm, non-flexible, elongate wetting member having absorbent and capillary qualities, one integral, non-flexible end of said wetting member being positioned within said reservoir means and in contact with the wetting agent for absorbing the wetting agent and passing the wetting agent by capillary action to the other integral end of said wetting member which is positioned away from said reservoir means and in the path of travel of the yarn from the supply package to said yarn entry tube and




which comprises a solid of revolution for contact with the traveling yarn for applying the wetting agent thereto.

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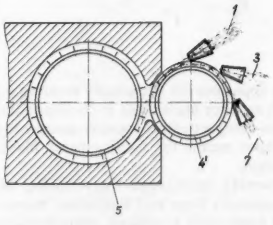
**3,864,902**
**APPARATUS AND METHOD FOR SPINNING YARNS COMPOSED OF FIBER BLENDS**

**Rolf Wehling, and Rolf Neubert, both of Bremen, Germany, assignors to Fried. Krupp, Gesellschaft mit beschrankter Haftung, Essen, Germany**

**Filed Jan. 2, 1974, Ser. No. 429,770**
**Claims priority, application Germany, Jan. 10, 1973, 2300967**
**Int. Cl. D01h** *1/12*
**U.S. Cl. 57—58.95** **5 Claims**




2. In apparatus for spinning yarn formed of a blend of different types of fibers, the fiber types differing from one another with respect to at least one property, the apparatus including an open-end spinning machine composed of a rotating break-up roller and a spinning turbine rotating coaxially with the roller, and at least one feed roller rotatively mounted for delivering a stream of rovings of such fibers to the break-up roller, the improvement comprising means supplying each

different type of fiber separately to said at least one feed roller; whereby the different types of fibers become mixed together only subsequent to being supplied to said at least one feed roller.

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3,864,903

## SYNTHETIC FIBROUS UNIT WHICH IS THREE-DIMENSIONALLY CRIMPED AND TWISTED

Isao Maki, Tokyo, Japan, assignor to Soko Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 24,658, April 1, 1970, abandoned. This application June 14, 1972, Ser. No. 262,635
Int. Cl. D02g 3/00, 3/02
U.S. Cl. 57—140 J 3 Claims

1. A synthetic fibrous unit made of a polyolefin consisting of a single stem having a predetermined cross-sectional width, a plurality of branches randomly formed integral of said stem, and a plurality of numerous fine hairs extending at random from said stem and said branches, the entire configuration of said fibrous unit being three-dimensionally crimped and twisted at random, said branches having a decreased cross-sectional width as compared with said predetermined cross-sectional width, said fine hairs having a cross-sectional width greatly decreased as compared with the cross-sectional widths of said stem and said branches, and numerous crevices are formed peripherally and internally throughout said fibrous unit.

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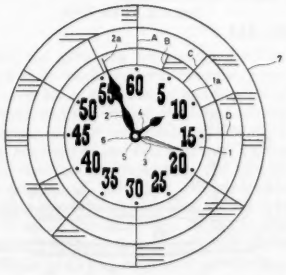
3,864,904

## WATCH WITH AN ADJUSTABLE TIME INTERVAL HAND

Botho Jung, Gruneburgweg 140, D-6000 Frankfurt (Main), Germany

Filed May 6, 1974, Ser. No. 467,475
Claims priority, application Germany, May 8, 1973, 172277[U]
Int. Cl. G04f 3/02
U.S. Cl. 58—22.9 10 Claims




1. A watch comprising a shaft, a minute hand mounted on said shaft, first means associated with said minute hand for rotating it about said shaft, an hour hand mounted on said shaft, second means associated with said hour hand for rotating it about said shaft, a dial positioned transversely of and extending outwardly from said shaft and located so that said minute and hour hands pass over said dial, a legend-bearing disc associated with said dial, wherein the improvement comprises a time interval hand mounted on said shaft and arranged to pass over said dial, third means associated with said time interval hand and mounted on said shaft for axial displacement thereon between a first position for positively connecting said time interval hand for rotation with said minute hand, and a second position for freely rotating said time interval hand around the axis of said shaft.

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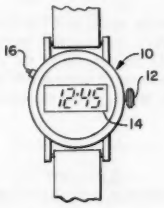
3,864,905

## HOROLOGICAL INSTRUMENT INCORPORATING MEANS FOR ILLUMINATING A LIQUID CRYSTAL DISPLAY

Kenneth J. Richardson, Hudson, Ohio, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 14, 1973, Ser. No. 415,735
Int. Cl. G04b 19/30; G04c 17/02
U.S. Cl. 58—50 R 9 Claims




1. A liquid crystal horological instrument including a display comprising a layer of liquid crystal material sandwiched between transparent parallel plates, transparent conductive patches on the plates adapted to form numerals when a source of potential is applied across selected ones of the patches, light reflective means on the side of the display opposite that which is viewed by an observer of the horological instrument, means for illuminating said display in the absence of ambient light, said latter-mentioned neans comprising a single electric lamp extending along an edge of the display, the lamp being shorter than the edge of the display and being positioned substantially midway between the edges of the display such that the lamp, without any dispersing means, will illuminate only the central portion of the display, a source of power for the lamp, and means for dispersing light produced by said lamp throughout substantially the entire area of said light reflective means.

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3,864,906

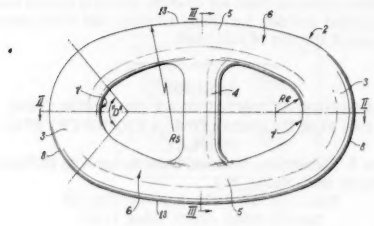
## CHAIN LINK

Clifford Frank Cullen, Lower Templestowe, Victoria, Australia, assignor to Vickers Ruwolt Pty. Ltd., Victoria, Australia

Filed June 22, 1973, Ser. No. 372,506
Int. Cl. F16g 15/12
U.S. Cl. 59—84 4 Claims

1. A chain link including; an elongate body section comprising a bar formed as a closed loop; a transverse bar extending between and interconnecting two longitudinal side portions of said body section, at a location intermediate the length of said body section; the cross-sectional size of said body section bar being smaller intermediate the length of each said side portion than at the end portions of said body section; the transverse surfaces of each said side portion of the body section being concave, and the outside surface of each said side portion is convex and follows an arc having a radius substantially equal to the pitch length of said chain link; each end portion of said body section having an inside surface facing generally towards said transverse bar and an outside surface facing away from said transverse bar, both said inside and outside surfaces being

curved so as to be convex in transverse cross section, and the curve of said inside surface being flatter than the curve of said outside surface; said inside surface being formed by an inner arcuate face and an outer arcuate face located on each side of said inner arcuate face, the radius of each said outer arcuate face being substantially equal to 62 percent of the radius of said inner arcuate face; said outside surface having a radius equal to substantially 50 percent of the radius of said inner arcuate face and the locus of said outside surface radius being located substantially midway between said inside and outside surfaces.



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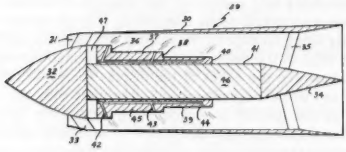
**3,864,907**

## STEP CYLINDER COMBUSTOR DESIGN

**Edward T. Curran, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Nov. 5, 1973, Ser. No. 412,859**
**Int. Cl. F02k 7/08**
**U.S. Cl. 60—261** **4 Claims**



1. In a ramjet engine having a main duct member, an air inlet and an expansion nozzle-forming structure; combustor chamber means incorporated in said duct member and comprising; a plurality of substantially cylindrically-shaped, combustor chamber-sections disposed in direct and continuous alignment with each other and in open communication between said air inlet and expansion nozzle-forming structure, each combustor chamber-sections being formed into a constant area configuration and respectively increasing in size in the downstream direction to thereby provide for the periodic, non-divergent and relatively even expansion of flow in separate stages and in all directions inherently ensuring better fuel-air mixing and thus the more efficient combustion thereof; separate combustion stability means inherently incorporated with and disposed at or near the upstream end of each of said combustor chamber-sections; and individually actuatable, heat-adding means positioned immediately upstream of each said combustor stability means, and selectively and individually operable to add varying amounts of heat to said combustor chamber means to thereby provide a positive, built-in control and regulation of the speed being inherently produced during the operation of said ramjet engine.

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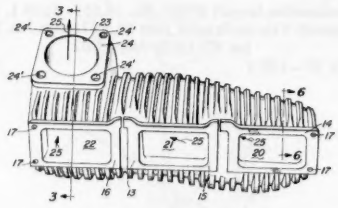
**3,864,908**

## DRY INSULATED PARTS AND METHOD OF MANUFACTURE

**Paul G. LaHaye, 3 Adams St., South Portland, Maine 04106**

**Continuation-in-part of Ser. No. 264,199, June 19, 1972, abandoned. This application May 24, 1973, Ser. No. 363,725**
**Int. Cl. F01m 3/10**
**U.S. Cl. 60—272** **7 Claims**



1. A cast metallic engine part
said part defining an outer irregularly shaped surface and being formed of an iron-containing metal defining a fluid carrying conduit therein uninterrupted by fluid seals,
an inorganic dry insulation layer overlying said outer surface and having a thermal conductivity in the range of from about 0.01 BTU/hr/ft/°F to 0.2 BTU/hr/ft/°F, and a cast metallic, protective encapsulating layer conforming to the shape of and covering said insulating layer,
said cast encapsulating layer being formed of a metal having a high thermal conductivity and selected from the group consisting essentially of aluminum, magnesium and alloys of these metals,
said encapsulating layer having a surface temperature below about 450° F at fluid temperatures within said part of from 500° F to at least 2,000° F,
said cast metallic encapsulating layer having a thermal coefficient of expansion matched to the thermal coefficient of expansion of said part so that over-all expansion of said part and metallic encapsulating layer are closely parallel to each other over the operating temperature range of said part.

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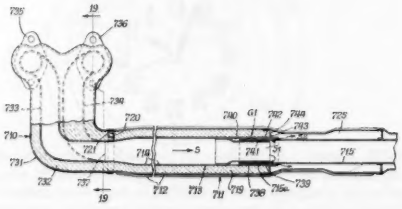
**3,864,909**

## THERMAL REACTOR WITH RELATIVELY MOVABLE INTERNAL PIPE SECTIONS

**Herbert Kern, Altensteig/Black Forest, Germany, assignor to Firma Friedrich Boysen, Stuttgart-Heumaden, Germany**

**Filed July 26, 1972, Ser. No. 275,336**
**Claims priority, application Germany, July 28, 1971, 2137699; Jan. 8, 1972, 2200815**
**Int. Cl. F01n 7/10**
**U.S. Cl. 60—282** **17 Claims**



1. A thermal reactor having an entrance and a discharge end for use with exhaust systems of internal combustion engines comprising:

an internal pipe divided into a plurality of separate sections in communication with each other B1 and disposed adjacently to each other along the longitudinal axis of the reactor;

joint means interconnecting two of said internal pipe sections;

an external tubular sleeve surrounding at least one of said separate sections of said internal pipe and radially spaced therefrom to form an annular cavity therebetween, the ends of said external sleeve being connected in an airtight manner to said internal pipe;

insulating material inserted in a portion of the annular cavity between said external sleeve and said internal pipe section, the portion of the reactor so insulated defining a reaction zone; and

a pressure equalization chamber disposed adjacent and rearwardly of said reaction zone and defined by that portion of the annular cavity between said external sleeve and said internal pipe section in which no insulation is present, said pressure equalization chamber being in flow communication with said internal pipe by way of said joint means.

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**3,864,910**

## DEVICE FOR SUPPLYING FLUID UNDER PRESSURE TO TWO REVERSIBLE LOAD ELEMENTS

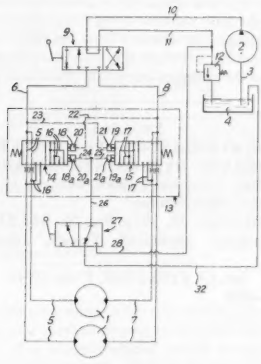
**Gerard H. Mechin, Nanteuil-le-Haudouin, France, assignor to Societe Anonyme Poclain, Le Plessis-Belleville, France**

**Continuation-in-part of Ser. No. 256,324, May 24, 1972, abandoned. This application Sept. 10, 1973, Ser. No. 395,445**

**Claims priority, application France, Nov. 17, 1972, 72.40991**

**Int. Cl. F15b** *11/22*

**U.S. Cl. 60—420** **13 Claims**



**1.** A device for supplying pressurized fluid to two load elements such as hydraulic motors, comprising two first conduits each connected to one load element and to a source of pressurized fluid, and two second conduits each connected to one load element and to an exhaust reservoir, a first flow divider being disposed in the first conduits, characterized in that the load elements are reversible, the first and second conduits are respectively placed in communication with the fluid source and the exhaust reservoir or vice versa, and a second flow divider is disposed in the second conduits, a third conduit connected to each first conduit and providing a by-pass for the first flow divider associated with the first conduits, a fourth conduit connected to each second conduit and providing a by-pass for the second flow divider associated with the second conduits, said by-passes being provided with position-controlling elements and so coupled as to maintain the two corresponding conduits in the same position, the control elements of the third and fourth conduits being respectively actuated by the pressure of the fluid in the second conduits downstream of the second flow divider with respect to the load elements and by the pressure of the fluid in the first conduits downstream of the first flow divider with respect to the load elements, so that the first and second conduits are respectively placed in communication with the fluid source, the free communication of the first and second conduits with the exhaust reservoir being assured by by-passing the first and second flow dividers, respectively.

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**3,864,911**

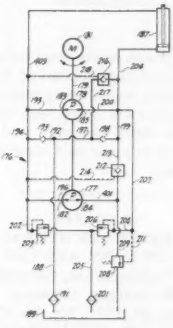
## HYDRAULIC SYSTEM WITH BI-ROTATIONAL PUMP

**Robert K. Gellatly, Los Gatos; Joel B. Meredith, San Carlos, and Richard A. Green, Mountain View, all of Calif., assignors to General Cable Corporation, San Carlos, Calif.**

**Filed Feb. 14, 1974, Ser. No. 442,483**

**Int. Cl. F16h** *39/48*

**U.S. Cl. 60—430** **9 Claims**



**1.** In a system for operating an hydraulic actuator, the combination of a first stage reversible pump, a second stage reversible pump, each pump having first and second ports and being capable of operating in a first mode in which its first and second ports assume respective suction and pressure functions and in a second mode in which its ports assume respective pressure and suction functions, fluid circuit means for directing fluid between the ports of the pumps and said actuator, said circuit means including fluid reservoir means, a suction circuit to direct fluid from the reservoir means to said ports, a first supply circuit to direct fluid under pressure from the first ports of said pumps to the actuator, a second supply circuit to direct fluid under pressure from the second ports of said pumps to said actuator, unloading valve means adapted to open for directing fluid from the second port of the first pump to the reservoir means responsive to pressure in the portion of the second supply circuit between the second port of the second pump and the actuator exceeding a given value, and duplexing valve means for precluding fluid flow from the second port of the second pump to the reservoir means when the loading valve means is open.

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**3,864,912**

## CONTROL APPARATUS FOR HYDRAULIC TRANSMISSION SYSTEM

**Sidney Arthur Othen, St. Helens, and John Morris, Halsall near Ormskirk, both of England, assignors to Joseph Lucas (Industries) Limited, Birmingham, England**

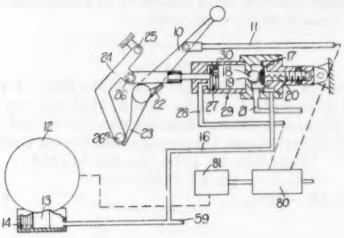
**Filed June 18, 1973, Ser. No. 370,699**

**Int. Cl. F16h** *39/46*

**U.S. Cl. 60—431** **10 Claims**

**1.** A control apparatus for a hydraulic transmission of the type having a fluid pump hydraulically connected to a fluid motor and in which the transmission ratio is variable by varying the ratio of the displacements of pump and motor, the pump being driven in use by an engine with which is associ-

ated a fuel control arrangement regulated by a signal pressure dependent on a throttle lever position and on the engine speed, said control apparatus comprising control means for varying the transmission ratio, an adjustable stop for limiting movement of said control means, a fuel pump forming part of said fuel control arrangement, said signal pressure being de-



rived from said fuel pump, means sensitive to said signal pressure for providing a control signal, and an actuating means for said stop, said actuating means being responsive to said control signal, the arrangement being such that, at a predetermined value of said signal pressure, said actuating means moves said stop so as to cause said control means to reduce the transmission ratio.

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**3,864,913**

## CONTROL APPARATUS FOR HYDRAULIC-LIFT TAIL GATES OF VANS, AND THE LIKE

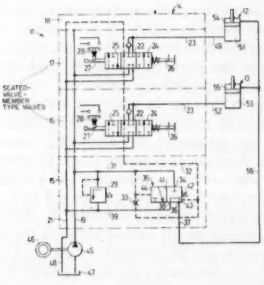
**Walter Herrmann, Vaihingen/Enz, Germany, assignor to Robert Bosch, GmbH, Stuttgart, Germany**

**Filed Nov. 29, 1973, Ser. No. 420,286**

**Claims priority, application Germany, Dec. 4, 1972, 2259294**

**Int. Cl. F15b** *11/08, 11/16*

**U.S. Cl. 60—433** **15 Claims**



1. In a hydraulic control apparatus for at least one double-acting consumer wherein at least one control valve includes at least one valve member movable between first operative, second operative and neutral positions to thereby respectively connect a first fluid-conveying line of said consumer with a supply conduit which is connected to a source of pressurized fluid, with a return conduit which is connected to a tank, and to seal said first line from said conduits, and wherein said valve member regulates the flow of fluid in a control conduit for a switch valve, the improvement which consists in said switch valve having a first port connected to said source of pressurized fluid, a second port connected to a second fluid-conveying line of said consumer, and a third port connected to said return conduit, and wherein said switch valve includes at least one valve member normally maintained in a first position establishing communication in said switch valve between said second and third ports and blocking flow through said first port and movable under the influence of fluid flow in said control conduit to a second position establishing communication in said switch valve between said first and second ports and blocking flow through said third port.

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**3,864,914**

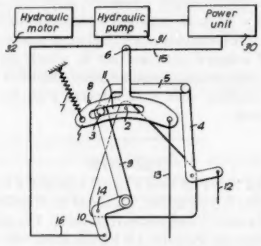
## CONTROL LINKAGES

**Sidney Timmins, Aldershot, England, assignor to Air-Log Limited, Hampshire, England**

**Filed July 24, 1973, Ser. No. 382,070**

**Int. Cl. G05g** *13/00;* **F04b** *49/00*

**U.S. Cl. 60—434** **9 Claims**




1. A control linkage comprising a control lever mounted for pivotal movement, means to pivot the control lever, a slide member constrained to slide along the control lever, means to control the movement of the slide member along the control lever, and a pivotally mounted output lever connected to the slide member by a link which link is pivotally connected to the output lever the slide member being constrained to slide along an arcuate path and the distance from the slide member to the pivotal connection between the output lever and the link being equal to the radius of curvature of the said arcuate path.

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**3,864,915**

## HYDRAULIC SYSTEM FOR DISPLACING A LOAD WITH AUTOMATIC HYDROSTATIC BALANCING

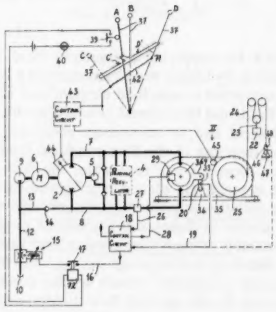
**Roger Metailler, Grenoble, France, assignor to Societe Anonyme Richier, Paris, France**

**Filed July 30, 1973, Ser. No. 383,534**

**Claims priority, application France, July 28, 1972, 72.27952**

**Int. Cl. F15b** *20/00;* **F16h** *39/46*

**U.S. Cl. 60—468** **15 Claims**



1. A hydraulic system for displacing a load, comprising: a lifting element operatively connected to said load;

a hydraulic motor operatively connected to said lifting element;
a variable-displacement hydraulic pump;
high-pressure and low-pressure hydraulic lines interconnecting said pump and said motor;
means for varying the displacement of said pump and thereby displacing said load at a rate proportional to the displacement of said pump;
brake means operatively connected to said lifting element for arresting said load;
an auxiliary hydraulic pump connectable to said high-pressure line;
pressure sensing means for detecting the hydraulic pressure in said high-pressure line;
force sensing means operatively connected to said lifting element for detecting the force said load exerts thereon; and
electronic control means connected between said sensing means and said brake means for releasing said brake means when said pressure in said high-pressure line is sufficient to overcome said force.

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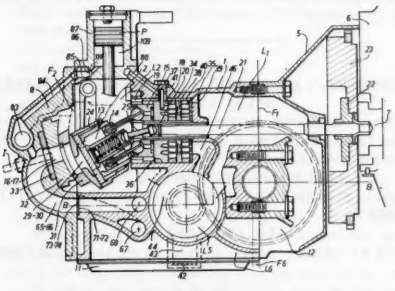
**3,864,916**
**HYDROSTATIC TRANSMISSIONS FOR MOTOR VEHICLES**

**Roger A. Maistrelli; Francois C. Pruvot, and Henri Poletti, all of Billancourt, France, assignors to Regie Nationale Des Usines Renault, Billancourt and Automobiles Peugeot, Paris, both of, France**

**Filed July 23, 1973, Ser. No. 381,519**
**Claims priority, application France, Sept. 25, 1972, 72.33843**
**Int. Cl. F16h** *39/10, 39/46*
**U.S. Cl. 60—485** **14 Claims**



1. Hydrostatic transmission for transmitting the mechanical power output of a thermal engine to the members driving the drive wheels of a motor vehicle, which comprises a main pump, two hydraulic motors, all three of the type comprising axial parallel pistons mounted in a common barrel of the broken axis and variable volumetric capacity type, duct means for interconnecting said hydraulic pump and motors, a reduction mechanism for dirving the wheels which is driven jointly from said hydraulic motors, a pump for over-feeding said connecting duct means, force-feed and overpressure valves, members for controlling the variation in the volumetric capacity of said main pump and hydraulic motors, a main casing closed by covers and secured to a casing of the reduction mechanism which is secured in turn to the thermal engine, said main casing comprising: a first chamber for receiving the reduction mechansim, which opens into the assembly or joint face of said reduction mechanism casing; a second chamber for receiving said main pump, which opens into the face opposite said assembly or joint face; a pair of chambers for said hydraulic motors, respectively, which are disposed symmetrically to a longitudinal vertical plane of said casing which extends centrally of the pump and reduction mechanism chambers, said motor chambers opening into the side faces of said main casing; antoher chamber for receiving the shafts of said hydraulic motors, which interconnects said hydraulic motor chambers and opens into said reduction mehanism chamber, and a further chamber constituting the oil reserve sump which opens into the lower face of said casing.

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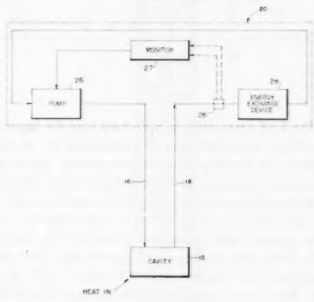
**3,864,917**
**GEOTHERMAL ENERGY SYSTEM**

**Charles H. Jacoby, Dalton, Pa., assignor to International Salt Company, Clark Summit, Pa.**

**Filed Mar. 19, 1970, Ser. No. 21,052**
**Int. Cl. E21b** *43/00;* **B65g** *5/00;* **B01a** *1/00*
**U.S. Cl. 60—641** **3 Claims**



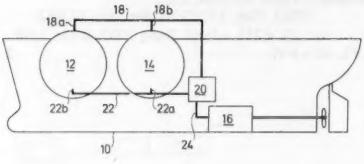

1. The method of providing a surface facility using heat energy at a predetermined heat flow rate by heat exchange from a fluid heat exchange medium having an initial temperature and flowing at a predetermined fluid flow rate such that the discharge temperature of the heat exchange medium is lowered to a known value, said heat exchange medium being chemically inert to and a non-solvent for sodium chloride salt, which method comprises the steps of:

a. determining the location of a salt dome which extends from a depth accessible by bore drilling techniques to a depth inaccessible by bore drilling techniques and into thermal continuity with a bed of elevated temperature material;
b. driving a bore hole into said salt dome to a selected accessible depth of at least about 10,000 feet at which the temperature of the salt is greater than said predetermined initial temperature of the heat exchange medium and at a point within said dome so as to maintain said thermal continuity with said bed of elevated temperature material;
c. solution mining salt at said point within the dome through said bore hole for a time sufficient to produce, at said selected accessible depth, a cavity having a heat transfer area of that particular size which will elevate the temperature of said heat exchange medium from said discharge temperature to said initial temperature thereof at said ground facility while the medium is introduced into and flows from said cavity at said predetermined fluid flow rate;
d. flushing said cavity through said bore hole with a fluid which will neither react with nor dissolve said salt thereby to terminate the solution mining of step (c) and maintain said particular size of the cavity;
e. circulating said fluid heat transfer medium through said bore hole, into said cavity and back to the ground surface at said predetermined fluid flow rate; and
f. abstracting heat energy from said heat transfer medium fluid at said desired heat flow rate at said surface facility.

## 3,864,918
## POWERED MOBILE LIQUEFIED GAS CARRIERS

Michael Lorenz, Hamburg, Germany, assignor to Sulzer Brothers, Ltd., Winterthur, Switzerland

Filed May 17, 1973, Ser. No. 361,032
Claims priority, application Germany, May 27, 1972, 2225882; June 10, 1972, 2228382; June 21, 1972, 2230263
Int. Cl. F01k 25/08
U.S. Cl. 60—651 21 Claims




1. A method of operating a powered mobile liquefied gas carrier in which liquefied gas is contained in at least one insulated vessel at the appropriate low temperature and substantially normal pressure, in which method gas produced by evaporation is collected and is divided into first and second part flows, the first part flow being compressed in itself and, while being cooled and liquefied, transferring heat to the second part flow, the re-liquefied gas of the first part flow being expanded and returned to the vessel and the heated second part flow being supplied as an energy source for driving the carrier.

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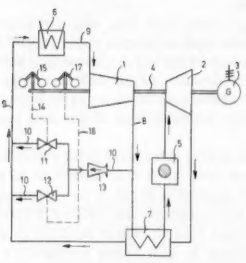
## 3,864,919
## RELIEF ARRANGEMENT FOR CLOSED GAS TURBINE INSTALLATION

Hansulrich Frutschi, Bruggerstrasse 292, 5223 Riniken, Switzerland

Filed May 21, 1974, Ser. No. 472,047
Claims priority, application Switzerland, June 8, 1973, 8344/73
Int. Cl. F01d 17/06
U.S. Cl. 60—657 7 Claims

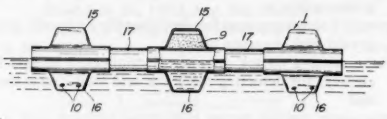



1. Relief arrangement for a closed gas turbine installation comprising in an endless flow path for the operating medium a compressor, a heater and a turbine; a relief pipe being provided which leads from a position of high pressure in said flow path to a position of lower pressure in said flow path; said relief pipe comprising at least two jointly redundant regulating valves connected parallel to one another as regards said operating medium; the improvement that a quantity limiter connected in series with said regulating valves is incorporated into said relief pipe.

## 3,864,920
## FLOATING BREAKWATER

Sadanori Tazaki, and Yozo Ishida, both of Tokyo, Japan, assignors to Bridgestone Tire Company, Limited, Tokyo, Japan

Filed Sept. 18, 1973, Ser. No. 398,368
Claims priority, application Japan, Sept. 19, 1972, 47-107980; Sept. 30, 1972, 47-113640; May 9, 1972, 47-54312
Int. Cl. E02b 3/06
U.S. Cl. 61—5 3 Claims




1. A floating breakwater assembly, comprising:
a. a plurality of substantially equally dimensioned, elongated, floating bodies each comprising a rigid hollow upper shell and a rigid hollow lower shell bonded together, each upper shell projecting upwardly and out of the water along its entire length to a height of at least one half of the average height of waves to be broken,
b. floatation material within each hollow upper shell,
c. ballast material within each hollow lower shell whereby the latter are submerged,
d. a plurality of spaced, elongated, rigid cylindrical members extending transversely of and between the floating bodies for bonding them together in a spaced assembly,
e. means for mooring the assembly to the sea bottom such that the floating bodies are generally perpendicular to the direction of movement of waves to be broken, and
f. the specific gravity of the overall assembly being from 0.15 to 0.75.

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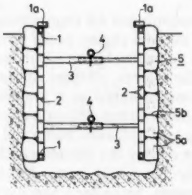
## 3,864,921
## METHOD AND APPARATUS FOR LINING THE WALLS OF EXCAVATIONS

Karl Marx, Ansprengerstrasse 14, 8000 Munich 23, and Zacharias Sandbrand-Nisipeanu, Lauingerstrasse 42, 8000 Munich 50, both of Germany

Filed Mar. 5, 1973, Ser. No. 338,256
Claims priority, application Germany, Mar. 7, 1972, 2210988
Int. Cl. E21b 5/06
U.S. Cl. 61—41 A 2 Claims




1. A method for lining generally planar side walls of an open trench excavated within a ground surface for supporting the side walls of the trench comprising the steps of:
spraying the open trench side walls with a stabilizing means;
inserting generally planar supporting walls carrying inflatable envelopes, upon outside surfaces thereof, within the open trench in contiguous but spaced relation to the generally planar side walls of the open trench;
fixing the supporting walls in a stationary spaced posture within the open trench by adjustment of struts extending between inside surfaces of the supporting walls; and

inflating the inflatable envelopes carried upon the outside surfaces of the supporting walls to mutually cross-react through the supporting walls and the struts against opposing side walls of the open trench to firmly stabilize the side walls of the open trench.

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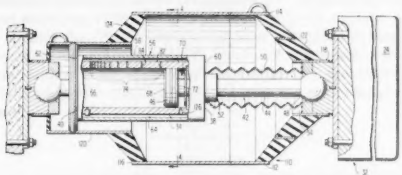
3,864,922

## SEALED CUSHIONING UNIT

**Darrell D. Dial, Fort Worth, and Robert J. von Bose, Arlington, both of Tex., assignors to Halliburton Company, Duncan, Okla.**

**Filed Mar. 22, 1974, Ser. No. 453,980**
**Int. Cl. E02b** *3/22*; **B61g** *9/16*
**U.S. Cl. 61—48** **16 Claims**



**1.** Apparatus operable to be positioned between a marine means and a protective bumper means for dissipating energy imparted to the protective bumper means by permitting cushioned relative movement of the protective bumper means relative to the marine means, said apparatus comprising:

cylinder means having wall means including,

side wall means,

first end wall means, and

second end wall means;

piston means slidably disposed within said cylinder means and including,

piston body means translatably mounted within said side wall means of said cylinder means, and

piston rod means translatably projecting through said first end wall means of said cylinder means and having a first end thereof connected to said piston body means;

means for operably connecting said second end wall means of said cylinder means to one of the marine means and the protective bumper means;

means for operably connecting said second, distal, end of said piston rod means to the other one of the marine means and the protective bumper means;

impedance means associated with said cylinder means and said piston means for cushioning translation of said piston body means from a normal position of adjacency to said first end wall wherein said apparatus is in an extended posture operably ready to dissipate energy imparted to the protective bumper means to a position of adjacency to said second end wall wherein said apparatus is in a closed posture operably following dissipation of energy imparted to the protective bumper means; and

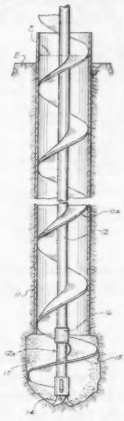
means surrounding said cylinder means and said piston means, and generally extending between said means for operably connecting said second end wall to one of the marine means and the protective bumper means and said means for operably connecting a second, distal, end of said piston rod means to the other one of the marine means and the protective bumper means, for isolating said cylinder means and said piston means from a surrounding marine environment and for continuously biasing said piston body means to a normal position of adjacency to said first end wall wherein said apparatus is in an extended posture operably ready to dissipate energy imparted to the protective bumper means.

3,864,923

## IMPACTED CASING METHOD FOR INSTALLING ANCHOR PILES OR TIEBACKS IN SITU

**Lee A. Turzillo, 2078 Glengary Rd., Akron, Ohio 44312**

**Filed Sept. 18, 1973, Ser. No. 398,311**
**Int. Cl. E02d** *5/38*, *5/44*; **E21c** *17/00*
**U.S. Cl. 61—53.6** **12 Claims**



**1.** A method of providing a pile or like body of self-hardenable cementitious material in an earth situs as for placing tiebacks or like members therein, comprising; the steps of providing a casing with a continuous flight auger rotatably and axially shiftably mounted therein, the auger having cutter means on the inner end thereof to be radially extendable and retractable by movement of the auger toward and from a projected position of the cutter means beyond the inner end of casing, driving said casing into the situs to define a bore of requisite depth, and rotating the continuous flight auger within said casing for removing earth from the defined bore along the auger flighting and through said casing; and further rotating said auger while said cutter means on an inner end thereof is projected beyond the inner end of the casing, with said cutter means radially extended to form an enlargement in the defined bore beyond said inner end of the casing.

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3,864,924

## DIVING BELL FOR WELLHEAD PLACING AND MAINTENANCE IN SHALLOW WATER

**Maurice Joseph Piotin, Boulogne, France, assignor to Subsea Equipment Associates Ltd., Hamilton, Bermuda**

**Filed Oct. 17, 1973, Ser. No. 407,392**
**Claims priority, application France, Oct. 17, 1972, 72.36677**
**Int. Cl. B63c** *11/44*
**U.S. Cl. 61—69 R** **16 Claims**

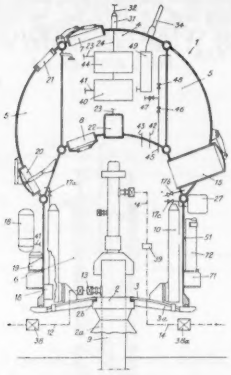
**1.** A diving bell adapted to rest on a base platform at the bottom of a body of water, said diving bell comprising:

a. a control chamber;

b. a work chamber beneath said control chamber, said work chamber being open at the bottom; and

c. an external ballast chamber, said ballast chamber having at least one outlet at its base and at least one outlet at its top, both of which connect the inside of said ballast chamber with the outside medium,

whereby, if both the upper and lower outlets are opened during immersion of the diving bell, the effect of the swell on



the diving bell is largely overcome, particularly when the level of the water lies between the upper and lower outlets.

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**3,864,925**

## APPARATUS FOR USE IN DRIVING TUNNELS

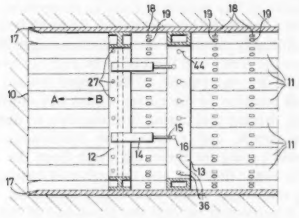
**Adolf Foik, Altlunen, Germany, assignor to Gewerkshaft Eisenhutte Westfalia, Westfalia, Germany**

**Filed Apr. 18, 1973, Ser. No. 352,173**

**Claims priority, application Germany, Apr. 20, 1972, 2219271**

**Int. Cl. E01g** *3/02*

**U.S. Cl. 61—84** **17 Claims**



**1.** In an apparatus for use in driving tunnels or the like, the apparatus including two parallel, spaced-apart, substantially circular frames conforming to the general shape of the tunnel interior, a plurality of piston-cylinder units attached between the two frames for effecting relative displacement, and a plurality of elongated plank members arranged side by side around the outer peripheries of the frames to form a lining for the tunnel, the improvement therein comprising locking means for selectively locking and unlocking the elongated plank members to the frames to permit selected plank members to be moved forward lengthwise of the tunnel, said locking means comprising:

a. the second of the two frames having a plurality of second locking pins mounted thereon, said second locking pins being independently movable radially; and

b. the elongated plank members each having a plurality of longitudinally spaced apart second locking pin receiving apertures formed on the interior plank surface, said second locking pins being selectively extended into said second apertures to permit selected plank members to be moved forwardly by said second frame, said second locking pins being retracted out of said second apertures to permit said second frame to be moved rearwardly without moving the plank members.

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**3,864,926**

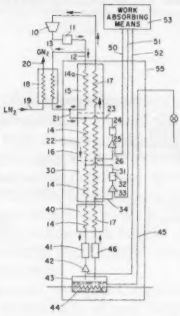
## APPARATUS FOR LIQUEFYING A CRYOGEN BY ISENTROPIC EXPANSION

**Samuel C. Collins, Oxon Hill, Md., assignor to Cryogenic Technology, Inc., Waltham, Mass.**

**Continuation of Ser. No. 81,937, Oct. 19, 1970, abandoned. This application June 21, 1973, Ser. No. 372,106**

**Int. Cl. F25j** *3/00*

**U.S. Cl. 62—38** **5 Claims**




**1.** An apparatus for liquefying helium, comprising in combination

a. high-pressure fluid flow path means;

b. low-pressure fluid flow path means;

c. heat exchange means arranged to provide heat exchange between high-pressure helium flowing in said high-pressure fluid flow path means and low-pressure helium flowing in said low-pressure fluid flow path means;

d. means to divert a portion of said high-pressure helium from said high-pressure fluid flow path means, to expand the helium so diverted and to introduce the resulting cooled low-pressure helium into said low-pressure fluid flow path means at at least one temperature level within said heat exchange means;

e. liquefied fluid receptacle means;

f. a slow-speed intermittent expansion engine arranged to periodically receive high-pressure cold helium and to isentropically expand said helium with the production of mechanical energy thereby to liquefy at least one portion of said high-pressure helium and discharge the at least partially liquefied helium into said receptacle means;

g. surge chamber means in said high-pressure fluid flow path means between said heat exchange means and said expansion engine and arranged to receive and store high-pressure cold helium discharged at the cold end of said heat exchange means and to deliver said high-pressure cold helium periodically to said expansion engine; and

h. means to return nonliquefied low-pressure helium from said receptacle means through said low-pressure fluid flow path means.

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**3,864,927**

## METHOD AND APPARATUS FOR STORAGE, TRANSPORT, AND USE OF CRYOGENIC GASES IN SOLID FORM

**Chou H. Li, 379 Elm Dr., Roslyn, N.Y. 11576**

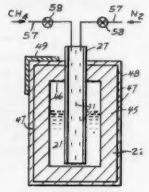
**Filed Dec. 14, 1972, Ser. No. 315,184**

**Int. Cl. F17c** *3/02*

**U.S. Cl. 62—47** **36 Claims**

**1.** A cryogenic system for a single solid cryogenic medium normally in the gaseous state but capable of being liquefied and solidified at subatmospheric temperatures, comprising: a

plurality of adjoining, close-packed compartments adapted to store therein the single cryogenic medium; layered material forming walls separating and enclosing the compartments; the separating walls allowing any two adjoing compartments to mechanically interact directly therethrough; means for supplying the single cryogenic medium in the fluid state to all the



compartments; and means for supplying a refrigerating fluid in heat exchange relationship with the cryogenic medium so as to solidify the fluid cryogenic medium into close-packed but disconnected cryogenic solid blocks of essentially uniform composition in all the compartments thereby preventing the information of a crack extending across the entire length of a dimension of the cryogenic system.

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**3,864,928**

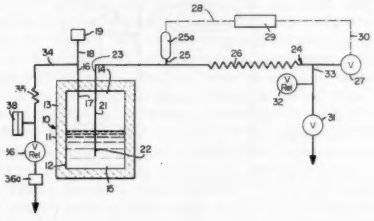
**ALL-ATTITUDE CRYOGENIC VAPOR VENT SYSTEM**

**Lester Kurt Eigenbrod, Indianapolis, Ind., assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 311,091, Dec. 1, 1972, Pat. No. 3,797,262. This application Mar. 18, 1974, Ser. No. 452,119**

**Int. Cl. F17c *7/02***

**U.S. Cl. 62—50** **10 Claims**



**1.** In a cryogenic liquid storage-gas supply system including a thermally insulated cryogenic liquid storage-dispensing containing having top and bottom ends and being invertible between top-up dispensing and bottom-up filling positions, gas vent-liquid fill conduit means with a first end terminating in the container top end and a second end outside said container top end, liquid withdrawal-gas vent conduit means with a first end terminating in the container bottom end and a second end outside said container top end, an invertible liquid vaporizing-gas vent control circuit outside the container and joined at a first inlet end to the liquid withdrawal-gas vent conduit means second end and including a first atmospheric vaporizer, and gas flow regulating means between said first atmospheric vaporizer and the gas discharge other end of said circuit: the improvement of an all-attitude gas relief circuit for said container comprising (a) first pressure relief means between said first atmospheric vaporizer and said gas flow regulating means, (b) branch conduit means having one end in flow communication with the gas vent-liquid fill conduit second end, (c) second flow restriction-pressure relief means in branch conduit (b) constructed to vent gas at lower pressure than said first pressure relief means and at maximum rate between 3 and 25 times the normal evaporation rate from the container, and (d) a second atmospheric vaporizer in flow communication at its inlet end with the branch conduit (b) one end and in flow communication at its discharge end with the second flow restriction-pressure relief means, and constructed with a heat transfer capacity not greater than one-third the first atmospheric vaporizer capacity and also sufficient to vaporize cryogenic liquid entering its inlet end and discharge gas at rate between 1.04 and 1.30 times the maximum vent rate of (c).

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**3,864,929**

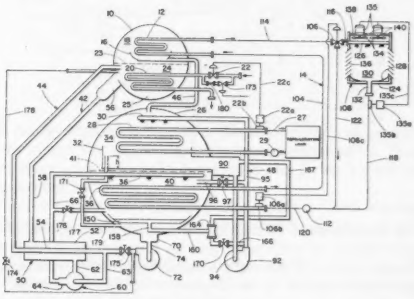
**ABSORPTION REFRIGERATION SYSTEM**

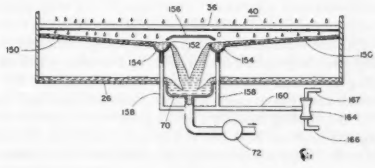
**Neil E. Hopkins, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Dec. 5, 1973, Ser. No. 421,896**

**Int. Cl. F25b *15/06***

**U.S. Cl. 62—101** **4 Claims**



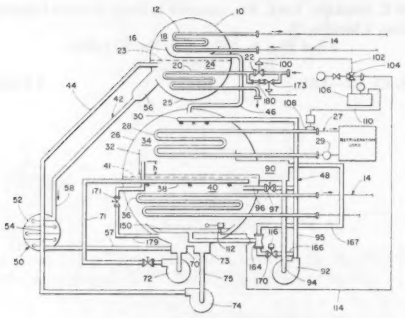


**1.** An absorption refrigeration system comprising a generator, a condenser, an evaporator and an absorber connected in a closed, absorption refrigeration circuit; a common shell enclosing said evaporator and said absorber and having a lower portion thereof defining a sump; a first heat exchanger associated with said evaporator; a refrigeration circuit adapted to circulate refrigerant over said first heat exchanger and abstract heat from a fluid circulating therein; a second heat exchanger associated with said absorber through which a cooling medium may be circulated, said second heat exchanger being located above said sump; means for withdrawing absorbent solution collected in said sump and transferring at least a portion thereof over said second heat exchanger; means defining a first fluid flow path for absorbent solution passing over said second heat exchanger to said sump during normal operation of the system; and means defining a second, alternate fluid flow path for intercepting condensed refrigerant passing from the surface of said second heat exchanger and directing the same to said refrigeration circuit during the free cooling mode of said system, whereby solution may be stored in said sump during operation when refrigerant is being condensed on said second heat exchanger.

## 3,864,930
## CONTROL FOR ABSORPTION REFRIGERATION SYSTEM

Neil E. Hopkins, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 5, 1973, Ser. No. 421,897
Int. Cl. F25b *15/06*
U.S. Cl. 62—101 6 Claims



1. In a method of controlling refrigeration system of the type having an evaporator and an absorber connected in a closed circuit for normally conducting a refrigerant and an absorbent solution in an absorption refrigeration cycle, the absorber being arranged in the closed circuit to receive refrigerant vaporized in the evaporator and normally being provided with absorbent solution for absorption of the vaporized refrigerant; means defining a chilling circuit for circulating a chilled fluid in heat-exchange relation with a refrigeration load and including a first heat-exchanger in the evaporator for abstracting heat from the fluid and rejecting it to the refrigerant to chill the fluid and to vaporize the refrigerant; and means defining a cooling circuit for circulating a cooling medium and including a second heat-exchanger in the absorber for normally abstracting heat from the absorbent solution and rejecting it to the cooling medium; and a generator supplied with a heating medium to boil off refrigerant from the absorbent solution; the steps of operating the absorber to condense the vaporized refrigerant by circulating the cooling medium in the second heat exchanger at a temperature lower than a temperature of the chilled fluid which will satisfy the refrigeration load; circulating refrigerant condensed in the abosrber to the evaporator; and supplying heating medium to said generator at a reduced rate sufficient to prevent migration of refrigerant to said absorbent solution.

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## 3,864,931
## PROCESS AND APPARATUS FOR FOOD FREEZING

Manfred Guttinger, Leinfelden, Germany, assignor to Sandco Ltd., Ottawa, Canada

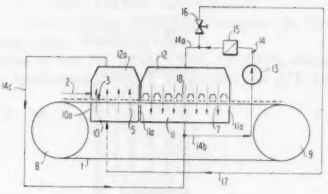
Filed Jan. 19, 1973, Ser. No. 325,047
Claims priority, application Germany, Jan. 19, 1972, 2202293
Int. Cl. F25d *13/06*
U.S. Cl. 62—63 12 Claims

1. Process for freezing foodstuffs comprising the successive steps of:

placing foodstuffs in a relatively flat layer on a support,

applying a first flow of cooling medium against said flat layer at a plurality of spaced positions on the support and in a direction from said support toward said flat layer so as to form frozen channel portions through said flat layer at said spaced positions,

and applying a second flow of cooling medium against said



flat layer in a direction toward said support so as to freeze the remainder of said layer.

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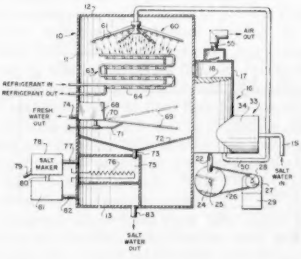
## 3,864,932
## SEA WATER DESALTING APPARATUS

Wan-Om Hsiao, New Kowloon, Kowloon, Hong Kong, assignor to Pioneer Science Limited, Kowloon, Hong Kong

Filed June 12, 1973, Ser. No. 369,353
Int. Cl. B01d *9/04*
U.S. Cl. 62—123 9 Claims

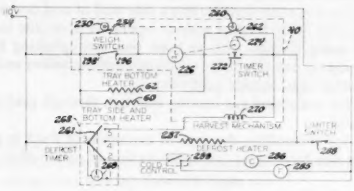


9. Saline water desalting apparatus comprising a chamber, pump means associated with said chamber, said pump means including a housing with piston means reciprocably mounted therein, said housing having a first portion communicating with the interior of said chamber through a unidirectional valve which permits flow of air from the chamber to said first portion, means for discharging air under pressure from the first portion of said housing, said housing having a second portion separated from said first portion by said piston means, means for introducing saline water into said second portion, a discharge line having one end communicating with the second portion of said housing, said piston means intermittently forcing the water from said second portion into said discharge line under pressure, the other end of said discharge line terminating within said chamber, means connected to the other end of said discharge line for atomizing the saline water under pressure and spraying the same into said chamber, and temperature modifying means in said chamber, whereby said pump means creates a subatmospheric pressure within said chamber and intermittently sprays atomized saline water into said chamber so that said temperature modifying means separates potable water from the saline water.

## 3,864,933
## DEFROST TIMER ARRANGEMENT FOR MAKING CLEAR ICE

James A. Bright, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1973, Ser. No. 419,942
Int. Cl. F25c *5/18*
U.S. Cl. 62—137 5 Claims

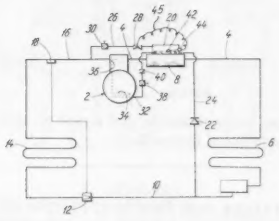



1. A clear ice maker for a freezer having defrost means and a defrost timer for periodically defrosting said freezer, said ice maker comprising a tray having walls adapted to contain a body of water, a grid in said tray having cavity-forming means for displacing the body of water contained by said walls into the cavity, means distributing subfreezing air over the top planar surface of said body of water in said grid cavity for a sufficient period to initiate the freezing of clear ice in said grid cavity along the interface between said air and said top planar surface and to continue the freezing of clear ice downwardly in said grid cavity, and a bucket for storing said clear ice in said freezer and being removable from said freezer, tray heating means energizable to maintain said body of water in a liquid state adjacent said tray below the freezing clear ice, and harvesting mechanism operable in a harvest cycle by a drive motor for removing said grid and clear ice from said tray before the freezing of clear ice downwardly in said grid cavity reaches the bottom wall of said tray and for depositing said clear ice in said bucket, said harvesting mechanism including a weigh switch, a bistable first timer switch and said drive motor in series electrical flow relationship, said first timer switch having the characteristic of stability in both its open and closed positions and operating in its closed position to enable the initiation of said harvest cycle by operating said harvest mechanism when said weigh switch is closed, said weigh switch having a closed position when said bucket is empty and an open position when said bucket is full of clear ice or removed from said freezer, said harvesting mechanism having a second timer switch in shunt with said weigh switch and a third timer switch in shunt with said first timer switch, said drive motor operating to actuate said second and third timer switches to maintain the operation of said drive motor and harvesting mechanism once said harvest cycle is initiated irrespective of said weigh switch and said first timer switch, said drive motor operating to actuate said second and third timer switches to terminate said harvest cycle, and said drive motor operating to move said first timer switch to its stable open position after said second and third timer swiches have been actuated to maintain the operation of said drive motor and before said harvest cycle is terminated, said heating means comprising a heater for a wall of the tray in shunt with said weigh switch and said second timer switch and in series electrical flow relationship with said first timer switch, said defrost timer including ice maker means initially operable to move said first timer switch to its stable closed position when said freezer is not being defrosted and subsequently operable to permit the movement of said first timer switch to its stable open position whereby said heater is adapted for temporary energization when a harvest cycle is initiated by the movement of said first timer switch to its stable closed position and said bucket is either full of clear ice or removed from said freezer, said temporary energization continuing until said bucket is replaced in said freezer and is no longer full.

## 3,864,934
## COOLING PUMP SYSTEM

Carl-Eric Christian Jeding, Risskov, and Vagn Hovgaard Villadsen, Viby J., both of Denmark, assignors to Aktieselskabet Thomas Ths. Sabroe & Co., Aarhus Hojbjerg, Denmark

Filed Sept. 21, 1972, Ser. No. 291,026
Claims priority, application Denmark, Sept. 24, 1971, 4656/71
Int. Cl. F25b *31/00*
U.S. Cl. 62—196 13 Claims




1. An apparatus having a heat developing part comprising:
pump means for supplying a cooling medium to the heat developing part, said heat developing part being cooled by said cooling medium;
control means for regulating the supply of said cooling medium in response to heat generated by said heat developing part,
said pump means including a thermal positive displacement pump of the type having a closed container partly filled with a liquid pumping medium,
said closed container including an outlet pipe for said liquid pumping medium, an inlet pipe for refilling said liquid pumping medium into said closed container, said inlet pipe being connected to a reservoir of said liquid pumping medium, and inlet control means for regulating said refilling of said closed container; and
a heating source in heat conduction connection with said closed container for heating said closed container sufficiently to cause said liquid pumping medium in said closed container to boil so that the vapour pressure in said closed container is sufficiently increased to cause the liquid pumping medium to be forced out through said outlet pipe for supplying said cooling medium to said heat developing part,
wherein said heat developing part at least partly constitutes said heating source in heat conduction connection with said closed container so as to effectively cause the supply of the cooling liquid to be adjusted in direct response to the temperature variations of the heat developing part.

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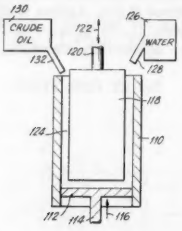
## 3,864,935
## APPARATUS FOR IMPROVED SHIPPING OF CRUDE OIL RELATIVE TO ENVIRONMENT DAMAGE AND ECOLOGICAL PROBLEMS

Jesse M. Elson, 138 E. Washington Ave., Pearl River, N.Y. 10965

Filed Mar. 22, 1973, Ser. No. 343,925
Int. Cl. F25c *1/04*
U.S. Cl. 62—356 2 Claims

1. Apparatus for avoiding ecological problems while moving crude oil between two geographically displaced locations, said apparatus comprising freezing means to freeze said oil into units, and transport means to transport said units from one location to the other, said freezing means including mold means to mold said units in like geometrical forms, said transportation means including a tube through which said units are transported, said tube having a cross-section corresponding to that of said geometrical forms, said freezing means including

mold means to freeze open containers from a fluid other than said crude oil, means to pour oil into said containers, and




means to close said containers, and means to close said containers with additional frozen fluid.

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**3,864,936**

**CONTAINER FOR SHIPPING PERISHABLES**

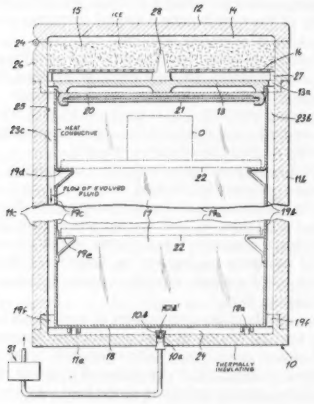
**Martin Frank, Cologne, and Karl Frank, Linz am Rhine, both of Germany, assignors to Burger Eisenwerke AG, Herborn/Dillkreis, Germany**

**Filed Jan. 16, 1974, Ser. No. 433,651**

**Claims priority, application Germany, Jan. 31, 1973, 2304718**

**Int. Cl. F25d** *3/12*

**U.S. Cl. 62—385** **1 Claim**




1. A shipping container comprising: an outer box forming a substantially closed chamber having a base formed with an outlet opening outside said box and into said chamber;

means in said chamber forming a substantially closed compartment adapted to receive freight;

means in said chamber above the freight compartment for supporting ice and forming an ice compartment;

means in said chamber defining a vertical passage next to and in heat-exchanging juxtaposition with said freight compartment and extending downwardly therepast from said ice compartment to said outlet, whereby fluid evolved from ice in said ice compartment flows down in said passage over said freight compartment to cool same and flows out of said chamber at said outlet, said box having a plurality of connected side walls, a top wall bridging said side walls above said ice compartment, and a bottom wall bridging said side walls below said freight compartment at said base, said walls being of insulating material, said means forming said freight compartment having at least two side walls spaced from two respective side walls of said box, a bottom wall spaced from the box bottom wall, and a top wall spaced from the box top wall and defining therewith said ice compartment, said side walls of said freight compartment beigh of heat-conducting material, said outlet being a throughgoing hole in the box bottom wall, said means forming said ice compartment including a rigid perforated support plate for said ice secured to said box side walls, at least one of the box side walls constituting a side wall of said compartment and being formed with an openable door, the latter wall being formed with at least one throughgoing hole opening on one side into said freight compartment and on the other side outside said box;

means for collecting gas leaving said box through said outlet; and

means for controlling the rate of evolution of fluid in said container by varying the cross-section of said outlet.

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**3,864,937**

**RECTIFIER CONSTRUCTION FOR ABSORPTION TYPE REFRIGERATOR**

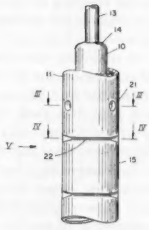
**Amram Asher, Oberengstringen, and Nicolas Eber, Unterengstringen, both of Switzerland, assignors to Sarlab Aktiengesellschaft, Zurich, Switzerland**

**Filed Feb. 12, 1974, Ser. No. 441,808**

**Claims priority, application Sweden, Feb. 13, 1973, 730/73**

**Int. Cl. F25b** *15/04*

**U.S. Cl. 62—496** **8 Claims**



1. An absorption refrigerating apparatus provided with a boiler having a rectifier, said rectifier comprising two pipes in which one pipe is located concentrically within the other pipe to form a space therebetween functioning as a flow path, the raised absorption solution in said apparatus flows downwardly in said space while the refrigerant and the absorption medium vapors flow upwardly therein, said flow path having a series of constrictions formed in a part of one of said pipes above a zone in which heat is supplied to said boiler wherein each constriction has at least one angled, corner-shaped part forming a wide portion and at least one narrow portion that are interconnected.

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**3,864,938**

**REFRIGERANT FLOW CONTROL DEVICE**

**Richmond S. Hayes, Jr., Fayetteville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed Sept. 25, 1973, Ser. No. 400,475**

**Int. Cl. F25b** *39/02*

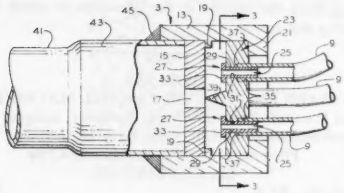
**U.S. Cl. 62—504** **5 Claims**

1. A refrigerant flow control device for controlling the flow of refrigerant to a multi-circuit evaporator in a refrigeration system, said device comprising:

a distributor plate including refrigerant passages for passing refrigerant to feedlines leading to each of the circuits in the evaporators;

metering jets having tubular means extending into said refrigerant passages, said tubular means being dimen-

sioned to expand refrigerant flowing therethrough according to the load on the particular circuit receiving refrigerant from the respective metering jets;



a casing; and

an orifice plate having orifice means dimensioned to expand refrigerant flowing therethrough;

said orifice plate and said distributor plate being mounted in spaced parallel relation in said casing.

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**3,864,939**

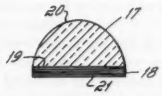
**DOUBLET HAVING FIBER OPTICAL ELEMENT FOR CHATOYANT OR ASTERISMAL DISPLAY**

**Michael R. Phillips, and Jerome H. Ludwig, both of Cleveland, Ohio, assignors to Queensbury Opal Co. Ltd., Cleveland, Ohio**

**Division of Ser. No. 261,022, June 8, 1972, Pat. No. 3,742,731. This application Apr. 24, 1973, Ser. No. 354,100**

**Int. Cl. A44c** *17/00*

**U.S. Cl. 63—32** **6 Claims**



**1.** A doublet gemstone construction comprising a gem of light-transmitting material having an optical display surface and a base portion, said construction further comprising means for creating at least single-lined light display on said gem surface, said means including a fiber optical element mounted on said base portion, said element comprising a solid fused bundle of a multitude of fine, elongated visible light-conducting fibers having cores of high refractive light index surrounded with a clad layer of lower refractive light index, said fibers arranged to extend in parallel side-by-side relation to each other in a direction generally parallel to said base portion for conducting light and for said display of light on said gem surface.

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**3,864,940**

**FLEXIBLE COUPLING MEANS**

**Arthur L. Black, Corning, N.Y., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Aug. 1, 1973, Ser. No. 384,449**

**Int. Cl. F16d** *3/78*

**U.S. Cl. 64—13** **4 Claims**

**1.** Flexible coupling means

for use in coupling together first and second rotary elements, comprising:

journal means for supporting one of the rotary elements in a bearing for rotation about an axis; and

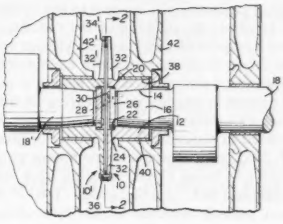
a plurality of axially flexible limbs, integral with, and extending radially from, said journal means, for coupling thereof to like limbs of a complementary, flexible coupling means supporting the other of the first and second rotary elements; wherein

said journal/supporting means comprises a hub;

said hub defining an annulus having a central, throughgoing bore for receiving an axial end portion of said one rotary element therewithin;

said securing means comprises means for retaining said end portion within said bore;

said bore is tapered, and further has an annular shoulder formed therewithin;



said shoulder is bounded by a wall;

said shoulder and wall define a recess for receiving said securing means therewithin;

said securing means comprises a retainer plate;

said plate having at least one bore hole formed therein for receiving a rotary-element-engaging fastener therethrough; and

said limbs have bolt holes formed therein adjacent the radial outermost ends thereof, for receiving fasteners for replaceable coupling of said limbs to like limbs of a complementary, flexible coupling means.

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**3,864,941**

**MULTIFEED CIRCULAR KNITTING MACHINE**

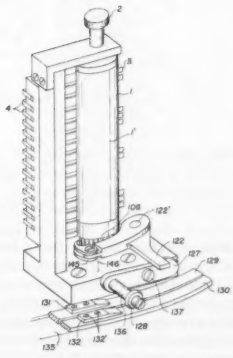
**Falk Kuhn, Kiebingen, Germany, assignor to Firma Fouquet-Werk Frauz & Planck, Rottenburg, Germany**

**Filed Sept. 7, 1972, Ser. No. 287,053**

**Claims priority, application Germany, Sept. 9, 1971, 2145121**

**Int. Cl. D04b** *9/38, 15/74*

**U.S. Cl. 66—50 B** **4 Claims**



**1.** Multifeed circular knitting machine to knit a plurality of *n* discrete patterns (A, B, C) located alongside each other on the knit fabric tube having

a plurality of pattern drums (**1–24**) located around the circumference of the machine and having, each, a datum point;

pattern selector means (**3**) located on the circumference of the drum with respect to said datum;

racking means (**106, 145, 146**) to index the pattern drums; and cam means (**131, 132**) engaging the racking means to cause indexing of the drums by a predetermined amount;

the improvement wherein

said cam means comprises a plurality of camming elements selectively located around the circumference of the machine and being formed to permit clamping of the camming elements at infinitely continuously adjustable circumferential positions with respect to the cylinder of the machine to adjust the position of the camming surfaces thereof with respect to any specific cylinder needle

to index the drums more than once for each machine revolution to permit knitting of fabric having a plurality of different pattern arrangements appearing on the fabric in predetermined widths and adjacent each other, the drums are associated in sequentially positioned *n* groups (**1–8; 9–16; 17–24**), first pattern selector means controlling a first pattern (A) being placed, starting from said datum, in first positions (**26A**) of a first group (**1–8**) of drums and subsequent pattern selector means controlling further patterns (B, C) being placed on sequential positions (26B, **26C**) on the drums of the first group (**1–8**) of drums, the first pattern selector means (**27B, 28C**) for each different pattern (B, C) being placed, starting from said datum, in respective first positions of subsequent groups (**9–16; 17–24**) of the drums, so that any drum has placed thereon in sequential, adjacent positions (**26A**, 26B, **26C; 27B, 27C, 27A; 28C, 28A′, 28B′, 28C′, 28A, 28B**) selector means controlling respective sequential knitted patterns (A, B, C).

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**3,864,942**

## PATTERN-SELECTING DEVICES FOR KNITTING MACHINES

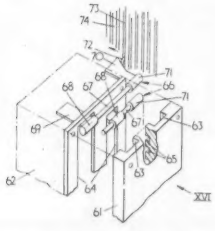
**Sidney Clifford Savage, Wigston Magna, and Peter Sinclair Stock, Oadby, both of England, assignors to Wildt Mellor Bromley Limited, Leicester, England**

**Filed Dec. 14, 1972, Ser. No. 315,081**

**Claims priority, application Great Britain, Dec. 20, 1971, 59155/71; Mar. 30, 1972, 15006/72**

**Int. Cl. D04b** *15/78*

**U.S. Cl. 66—50 R** **1 Claim**




1. In a pattern selecting device for a knitting machine, comprising a stack of selector members each having a butt-engaging portion movable between a butt-engaging position in which it is engageable with pattern butts on or associated with needles movable in relation to said pattern selecting device, and a butt-missing position in which the butt-engaging portion does not engage said pattern butts; the improvement that each selector member comprises an actuating part formed of magnetisable material and that the selecting device further comprises, associated with each selector member, a permanent magnet, pole pieces on said permanent magnet, opposed pole faces on said pole pieces, and an electromagnetic coil surrounding said permanent magnet and pole pieces, said actuating part of each selector member being movable transversely of the coil between the associated pole faces and being magnetisable by the associated coil for attraction to a selected one of the pole faces and repulsion from the other of the pole faces, and in that each selector member comprises a spindle freely mounted in a slot for rotational movement, each spindle carrying a rocker forming the said actuating part and a rocker forming the butt-engaging portion each rocker angularly extending from the spindle in the direction in which the said mounting slot opens.

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**3,864,943**

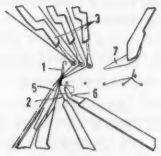
## WARP KNITTING OR RASCHEL MACHINE

**Roland Wunner, Bernstein/Wald, Germany, assignor to Liba Maschinenfabrik GmbH, Naila, Bavaria, Germany**

**Filed Sept. 6, 1973, Ser. No. 394,796**

**Int. Cl. D04b** *23/06*

**U.S. Cl. 66—84 A** **3 Claims**




1. In a warp knitting or Raschel machine comprising a row of vertical needles, a plurality of thread guides for supplying warp thread to said needles, a plurality of trick plates with knock-over edges, means for feeding filler thread to said needles for producing knitted fabrics, a plurality of filler threads being prepared to arrive horizontally at the level of the upper edge of said trick plates, a sinker arrangement consisting of a plurality of sinker plates disposed above said needles and above said trick plates, said sinker plates performing a substantially orbital movement in timed relationship to the needle movement, and a plurality of filler sinkers extending into the space between said trick plates and said needles and movably mounted below said sinker arrangement, means for imparting to said filler sinkers a substantially rectangular movement consisting of consecutive horizontal and vertical sections in timed relationship with the needle action and thus with the operation of said sinker arrangement, said filler sinkers being adapted to separate a filler thread and transport it to the back side of said needles and cooperate at this position and instant with said sinker arrangement which holds the filler thread down to the upper edge of said trick plates during the rising of said needles.

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**3,864,944**

## METHOD FOR MAKING A DOUBLE FACED WARP KNIT FABRIC

**George E. Jackson, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation of Ser. No. 102,628, Dec. 30, 1970, Pat. No. 3,757,540. This application Aug. 20, 1973, Ser. No. 389,476**

**Int. Cl. D04b** *23/02*

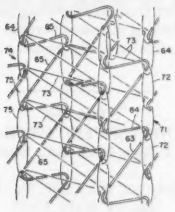
**U.S. Cl. 66—87** **3 Claims**

1. The method of making a double faced, warp knit, fabric by means of a double needle bar multiple guide bar warp knitting machine which comprises the steps of:

warp knitting two fabrics back to back on said two needle bars, with each fabric having a chain stitch knitted structure,

guiding a set of common, chain stitch yarns back and forth between said structures at each course and in each wale to bind said structures together and knitting said common chain stitch yarns to form chain stitch pillars in each said structure with each said common chain stitch yarn forming each successive chain stitch in each pair of opposite

successive chain stitches in each pair of opposite wales in each opposite face of said fabric, and



interconnecting said pillars in each said structure to provide strength and stability thereto in both warpwise and coursewise directions.

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**3,864,945**

## SLIDE FASTENER AND METHOD OF MAKING SAME

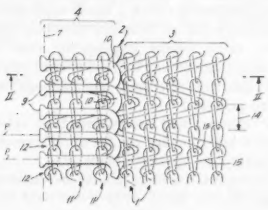
**Alfons Frohlich, Essen, Germany, assignor to Opti-Holding AG, Glarus, Switzerland**

**Filed Apr. 9, 1973, Ser. No. 349,005**

**Claims priority, application Germany, Apr. 7, 1972, 2216829**

**Int. Cl. D04b** *23/08, 23/10*

**U.S. Cl. 66—193** **14 Claims**



**1.** A slide-fastener half comprising:

an elongate monofilamentary coupling element forming a multiplicity of generally planar transverse loops each with two substantially parallel shanks interconnected by a bight portion, the bight portions of at least some of said loops bearing coupling heads engageable with complementary coupling heads on an adjoining slide-fastener half; and

a warp-knit fabric structure with chains of warp threads forming a plurality of parallel wales perpendicular to said loops, the shanks of each loop extending across several of said wales having chain stitches tied around at least one shank of each loop.

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**3,864,946**

## WARP-KNITTED FASTENER TAPES

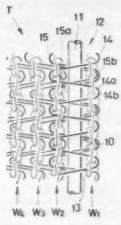
**Yoshio Matsuda, Nyuzen-machi, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 26, 1973, Ser. No. 427,848**

**Int. Cl. D04b** *23/08*

**U.S. Cl. 66—193** **5 Claims**

**1.** A supporting stringer tape for slide fasteners which comprises a warp-knitted structure comprising wales of longitudinally extending warp stitches connected coursewise by transversely extending weft threads, a reinforcing core inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, and a first fastening weft thread laid in from one direction to overlie said reinforcing core and a second fastening weft thread laid in from the opposite direction to underlie



said reinforcing core, said first and second fastening threads interconnecting at least said two adjacent wales.

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**3,864,947**

## APPARATUS FOR PRODUCING DYED AND CLEANED MATERIAL

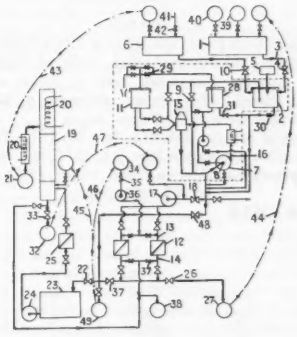
**Robert Borland Gray, Kilbarchan, England, assignor to J. & P. Coats Limited, Glasgow, Scotland**

**Division of Ser. No. 239,421, March 30, 1972, Pat. No. 3,801,276. This application Oct. 11, 1973, Ser. No. 405,275**

**Claims priority, application Great Britain, Apr. 3, 1971, 8622/71**

**Int. Cl. D06p** *1/68;* **B05c** *11/10;* **D06f** *43/08*

**U.S. Cl. 68—18 R** **13 Claims**

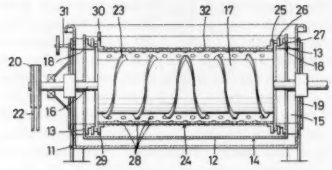


**1.** Apparatus for producing dyed and cleaned material comprising a dye carrier stock tank, a cleaning fluid stock tank, a mixing vessel connected to the dye carrier stock tank and the cleaning fluid stock tank by way of valve means, a kier for receiving material to be processed, a pump having inlet and outlet connections, valve means associated with the mixing vessel, the kier and the pump and operative to be set to connect the inlet of the pump to the mixing vessel and the outlet of the pump to the kier or to connect the kier to the inlet and the outlet of the pump at the same time to permit recirculation of the liquid contents of the kier, a filter capable of removing dye from the dye/dye carrier mixture and having an inlet and an outlet, the inlet being connectible by way of valve means to the kier and the outlet being connectible by way of valve means to a discharge outlet, and a cleaning fluid separator capable of separating cleaning fluid from the dye carrier and any dye contained therein, the cleaning fluid separator having an inlet connected by way of valve means to the outlet of the filter and discharge outlets for discharge of separated cleaning fluid and dye carrier with any dye remaining therein.

## 3,864,948
## SUCTION DRUM WASHER

Akira Domoto, Wakayama, Japan, assignor to Daiwa Machinery Works, Ltd., Wakayama-shi, Japan

Filed Apr. 19, 1973, Ser. No. 352,643
Int. Cl. B05c 3/132, 8/04
U.S. Cl. 68—184 6 Claims

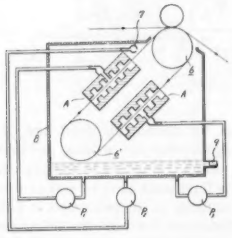



1. A suction drum washer comprising a semi-cylindrical outer tank, a semi-cylindrical inner tank mounted within said outer tank and at a lower level than an upper edge of said outer tank, said inner and outer tanks being spaced apart, said inner tank having openings at both ends thereof communicating with the space between said outer and inner tanks, a hollow suction drum rotatably mounted in said inner tank and opened at both ends thereof correspondingly to said openings of said inner tank, said suction drum having a plurality of holes in the periphery thereof, and a cylindrical body rotatably mounted in said suction drum and having right and left symmetrical helical fins on the periphery thereof, said fins causing a flow of a washing liquid longitudinally along the periphery of the cylindrical body upon the rotation thereof.

## 3,864,949
## APPARATUS FOR CONTINUOUSLY TREATING THREAD

Toshiaki Inoue; Shinyo Nakajima, both of Osaka; Tohru Uraya; Toshiaki Kanamori, both of Kobe, and Kazuo Fukuda, Himeji, all of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 166,815, July 28, 1971, Pat. No. 3,766,581. This application Mar. 23, 1973, Ser. No. 344,249
Claims priority, application Japan, Aug. 5, 1970, 45-070503
Int. Cl. B05c 5/02
U.S. Cl. 68—205 E 4 Claims

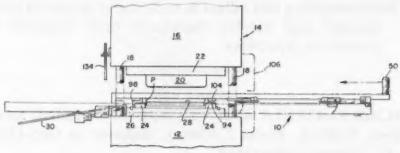



1. An apparatus for continuously treating a strand of filamentary material with liquid, comprising: a pair of elongated, rotatable, strand-delivery rolls spaced apart from each other and having their axes of rotation inclined toward each other; at least one pair of opposed, spaced-apart, elongated, generally parallel plates positioned in the space between said rolls, said plates extending lengthwise in the space for substantially the full axial length of said rolls, said plates also being elongated in a direction transverse to said rolls so that said plates occupy a substantial portion of the space between said rolls, the opposing surfaces of said plates being spaced apart to define therebetween a passageway for a strand so that a strand can be passed helically around said rolls and a plurality of spaced-apart flights of said strand will pass through said passageway; at least one of said plates having inlet means for liquid for directing liquid into and through said passageway; the opposing surfaces of said plates having a series of transversely spaced-apart grooves extending perpendicular to said passageway for effecting repeated vortical flow of the liquid in a direction perpendicular to the strand moving through said passageway.

## 3,864,950
## PUNCHPRESS FEED MECHANISM

Albert Dunkin, 12 Split Rock Rd., South Norwalk, Conn. 06854

Filed July 13, 1973, Ser. No. 379,161
Int. Cl. B21b 37/00
U.S. Cl. 72—6 17 Claims




1. A blank feeding fixture for punch presses of the type having a pair of relatively movable dies cooperable to form a part upon movement against a blank positioned between the dies, said fixture comprising:

blank carriage means movable between a retracted loading position remote from the press dies and an advanced transfer position at which a blank supported by said carriage means is placed between the press dies;

retractable latch means engageable with said carriage means upon movement thereof to said retracted loading position and for retaining said carriage means in said retracted position;

means for releasing said latch means from retaining engagement with said carriage means upon terminal movement of the press dies against a blank; and

control means for enabling relative movement of the press dies against the blank only when said latch means is operative to retain said carriage means in said retracted loading position.

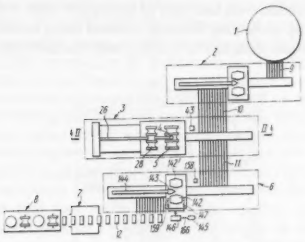
## 3,864,951
## DEVICE FOR PRODUCING SEMI-PRODUCT TUBES OF CONSTANT INNER DIAMETER WITH THINNED ENDS

Gennady Ivanovich Gulyaev, ulitsa Sevastopolskaya, 10, kv. 52, Dnepropetrovsk; Jury Nikolaevich Neznamov, ulitsa Chubarya, 13, kv. 62, Nikopol; Anatoly Ionovich Nechiporenko, ulitsa Vysokovoltnaya, 28/39; Viktor Yakovlevich Ostrenko, ulitsa Komsomolskaya, 65, kv. 44, both of Dnepropetrovsk; Petr Ivanovich Kutsenko, ulitsa Pestelya 4, Nikopol; Viktor Kharitonovich Kurilenko, ulitsa Korbuta, 7, kv. 3, Nikopol; Ivan Vasilievich Ermolov, ulitsa lenina, 56, kv. 8, Nikopol; Alexandr Ilich Chekmarev, ulitsa Karla Marxa, 108, Nikopol; Vladimir Grigorievich Voronko, ulitsa Lenina, 63, kv. 4, Nikopol; Ivan Petrovich Boiko, ulitsa Rostovskaya, 22, kv. 30, Nikopol; Vladimir Romanovich Mamontov, prospekt Kirova, 76, kv. 45; Jury Ivanovich Pustovoichenko, ulitsa Sofii Kovalevskoi, 55, kv. 46, both of Dnepropetrovsk; Gennady Mikhailovich Volovik, ulitsa 40 let Oktyabrya, 1, kv. 11, Nikopol; Vladislav Georgievich Zakharenko, prospekt Lenina, 12, kv. 7, Nikopol, and Viktor Prokhorovich Paschenko, ulitsa imeni Pravdy, 7, kv. 75, Nikopol, all of U.S.S.R.

Filed Dec. 19, 1973, Ser. No. 426,220
Int. Cl. B21b 37/00, 17/10
U.S. Cl. 72—6 12 Claims

1. An apparatus for forming tubes intermediate of their finished form at a constant inner diameter with end portions

of reduced thickness comprising: a two-high mill having opposing rolls provided with grooves of semicircular form in cross section, plug means located between said rolls, roll adjustment means for altering the gap between said



rolls and said plug means, control means for controlling the speed and direction of the displacement of said roll adjustment means to taper the end portions of a tube and limiting means for determining maximum and minimum roll gap.

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3,864,952

## APPARATUS FOR FORMING SPIRAL STEEL PIPE

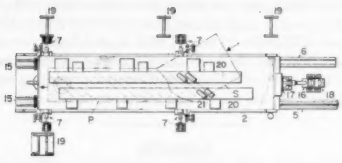
**Akira Matsufuji, 1-7-15, Sawami, Tobata-ku, Kitakyushu, and Kenji Numajiri, 2406, Oaza Hikino, Yawata-ku, Kitakyushu, both of Japan**

**Filed Nov. 28, 1972, Ser. No. 310,082**

**Claims priority, application Japan, Nov. 29, 1971, 46-96514; July, 47-85300**

**Int. Cl. B21c** *37/12*

**U.S. Cl. 72—135** **5 Claims**



1. In an apparatus for forming spiral steel pipe by pressing a steel strip against exterior forming rolls by mandrel rolls so as to bend said steel strip spirally, the mandrel rolls being mounted on a mandrel roll supporting stand and the exterior forming rolls being mounted on exterior forming roll supporting stands, the mandrel roll supporting stand being above the exterior forming roll supporting stands, the improvement comprising a freely movable truck having said exterior forming roll supporting stands fixedly mounted on the upper surface thereof, rails on the base of the apparatus on which said truck is movably mounted, said rails having raisable and lowerable portions at the positions where said truck is supported thereon when said exterior forming rolls are at their operative positions on the apparatus, clamps along said base engageable with said truck for fixing said truck at a predetermined position on the base, and supporting frame means adjacent said rails for releasably supporting said mandrel roll supporting stand at its operative position above said exterior forming roll supporting stands, whereby with the exterior forming roll supporting stand resting on said truck, said rail portions can be raised and said mandrel roll supporting stand released from said supporting frame means to rest on said exterior forming roll supporting stand, and said truck can be moved along said rails to remove both stands from the apparatus, and the stands can be replaced in the apparatus by a reverse sequence of operations.

3,864,953

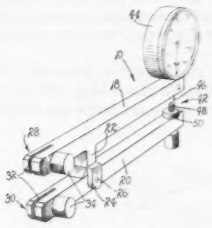
## METER FOR USE IN DETECTING TENSION IN STRAPS HAVING PREDETERMINED ELASTIC CHARACTERISTICS

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention by; George V. Buhler, 18570 Santa Ynez St., Fountain Valley, Calif. 92708, and Dale E. Havens, 323 Auienda Cerritas, Newport Beach, Calif. 92660**

**Filed Oct. 11, 1973, Ser. No. 405,342**

**Int. Cl. G01l** *5/06*

**U.S. Cl. 73—143** **2 Claims**



1. In a meter for use in indicating tension in straps having predetermined elastic characteristics, the improvement comprising:

a pair of mutually displaceable receivers, each receiver of said pair including a block having planar surfaces defining therewithin a slotted opening for receiving therebetween a selected portion of a strap having a propensity to elongate when placed in tension;

means for securing said block to the strap including a clamping pin supported for axial reciprocation along a path intersecting the plane of said planar surfaces;

a pair of elongated, juxtaposed arms, each arm of said pair being characterized by a distal end portion integrally related with one receiver of said pair whereby each receiver is supported at one end of said arm;

means including a pivot pin for pivotally coupling one arm of said pair to the other arm thereof, whereby the arms are supported for pivotal displacement about a common axis as motion is imparted to the arms;

pressure measuring means mounted on one arm of said pair, at the end opposite said distal end thereof, and having a plunger extended toward the other arm of said pair;

means including an anvil mounted on said other arm of said pair in juxtaposition with said plunger for applying thereto pressure of a magnitude dictated by the magnitude of displacement imparted to said receivers;

visual read-out means coupled with said pressure measuring means for indicating the magnitude of the pressure applied to said plunger;

the distance between said pivot pin and said plunger being at least three times the distance between said pivot pin and said clamping pins.

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3,864,954

## ROLL CHANGERS

**Werner W. Eibe, and Andrew Andrascik, both of Pittsburgh, Pa., assignors to Blaw-Knox Foundry & Mill Machinery, Inc., Pittsburgh, Pa.**

**Filed Dec. 4, 1973, Ser. No. 421,584**

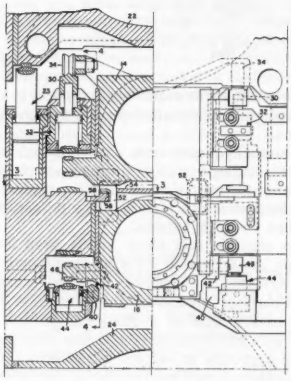
**Int. Cl. B21b** *31/08*

**U.S. Cl. 72—238** **17 Claims**

1. In a rolling mill having upper and lower work rolls defining a pass line for the strip to be rolled therebetween, an operator side mill housing defining a window, upper and lower work roll chocks for rotatably supporting the upper and lower work rolls and adapted to be removably mounted in said operator side housing, a mill housing on the drive side of the mill defining a window, an upper and lower work roll chock

for rotatably supporting the upper and lower work rolls on the drive side of the mill and adapted to be removably mounted in said drive side housing window, means for supporting said work roll chocks and said work rolls supported thereby in a separated condition during movement thereof inside of the mill housing, means for supporting said work roll chocks and the work roll supported thereby in separated condition during movement outside of the mill housing, said last-named means comprising first stool means positioned within said operator side housing and adapted to be positiond between said operator side work roll chocks and second stool means positioned within said operator side housing and adapted to be positioned between said drive side work roll chocks, and means for supporting said first and second stool means in said operator side housing window at a location between said upper and lower work roll chocks.

**12.** A side shift car for use in automatic changing of the work rolls of a mill stand of a rolling mill comprising a frame located adjacent the mill stand below the floor line of the mill



and adapted to be shifted between a pair of roll changing positions, power operated means for actuating said frame between said pair of roll changing positions, and means mounted on said frame providing two pair of rails adapted to support two sets of work rolls at a location adjacent the rolling mill stand, said rail providing means comprising a plurality of floor plates mounted for movement between a horizontal position in which said floor plates provide a floor area adjacent the rolling mill and an upright position in which the upper ends of said floor plates provide horizontally extending rails adapted to support said work roll, the floor plates providing each pair of rails being positioned in edge-to-edge relationship in said horizontal position thereof to provide a closed floor area, one of said pair of rails in said upright position thereof being aligned with said mill stand when said frame is in one of said pair of roll changing positions, the other of said pair of rails in said upright position thereof being aligned with said mill stand when said frame is in the other of said pair of roll changing positions.

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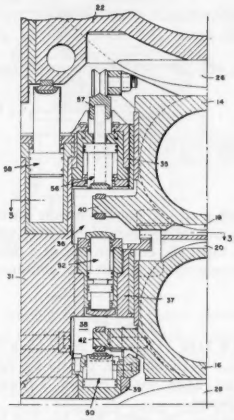
**3,864,955**

## ROLLING MILL STAND

**Werner W. Eibe, Pittsburgh, Pa., assignor to Blaw-Knox Foundry & Mill Machinery, Inc., Pittsburgh, Pa.**

**Filed Dec. 4, 1973, Ser. No. 421,583**
**Int. Cl. B21b** *31/00, 31/34*
**U.S. Cl. 72—238** **14 Claims**

**1.** In a rolling mill having upper and lower work rolls defining a pass line, a mill housing defining a window, upper and lower work roll chocks for rotatably supporting the upper and lower work rolls and adapted to be removably mounted in said housing window, said mill housing having housing portions on the vertical sides of said windows projecting inwardly from each vertical side in the region of said work roll chocks, said upper work roll chocks having outwardly projecting ears, said lower work roll chocks having outwardly projecting ears in opposed relation with said ears of said upper work roll chocks, said inwardly projecting housing portions being constructed to define recesses adapted to receive said ear portions, crown-



out hydraulic cylinder means for one of said work rolls mounted in said housing portions for applying a force to one of said work roll chocks to produce a crown-out load thereon, said housing portion comprising a first portion located above said ears of said upper work roll chocks, a second portion located below said ears of said lower work roll chocks and a third portion located between said ears of said upper and lower work roll chocks, and transducer means independently mounted in said third housing portion and extending between opposed ears on said upper and lower work roll chocks.

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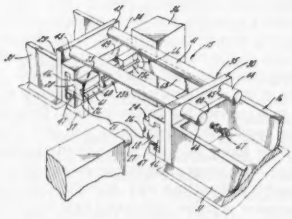
**3,864,956**

## DIE ASSEMBLY FOR USE IN A MACHINE AND METHOD FOR FORGING UPSETS ON A METAL BLANK

**Walton W. Barry, 11085 Fourth St. East, Treasure Island, Fla. 33706**

**Filed May 29, 1973, Ser. No. 364,379**
**Int. Cl. B21j** *5/08*
**U.S. Cl. 72—338** **9 Claims**



**1.** In a machine for forming a plurality of upsets on a metal blank, the combination of, a support, first and second spaced carriers movable on said support toward and away from each other, said carriers also being movable in unison from a receiving station where said blank is inserted between said carriers to a forging station where the upsets are formed on said

blank, a die assembly comprising first and second facing holders mounted on said first and second carriers, respectively, for movement therewith, a plurality of laterally spaced first die segments mounted on said first holder with one of said die segments being fixed on said first holder adjacent one end thereof and at least one other die segment being slidably mounted on said first holder for endwise movement in a direction laterally of said holder both toward and away from said fixed die segment, each of said die segments having at least one end cavity opening both in an endwise direction relative to said segment and toward said second holder, a plurality of second similar die segments similarly mounted on said second holder and facing said first die segments, each of said second die segments being paired with a corresponding similar one of said first die segments, said first and second die segments receiving said blank therebetween at said receiving station and coacting to clamp said blank therebetween as said carriers move said first and second segments together, means for severing said blank to a predetermined length as an incident to moving said carriers in unison from the receiving station and toward said forging station, said severing means including guide means for directing said blank into a position between said first and second die segments at said receiving station and coacting with said fixed die segments to sever the blank to its predetermined length as said die segments are moved in unison out of said receiving station and toward said forging station with said carriers, and means for sliding said movable die segments laterally of said holders toward said fixed die segments thereby to forge the upsets on the blank by causing some of the metal in the blank to flow into said cavities.

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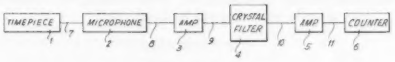
**3,864,957**

## METHOD AND APPARATUS FOR MEASURING THE TIMING OF QUARTZ CRYSTAL TIMEPIECES

**Kinji Fujita, Shimosuwa-machi, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Feb. 9, 1972, Ser. No. 224,722**
**Claims priority, application Japan, Feb. 10, 1971, 46-5218**
**Int. Cl. G04d** *7/12*
**U.S. Cl. 73—6** **2 Claims**



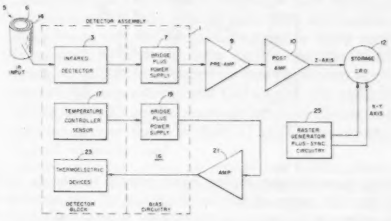

1. Apparatus for use with a timepiece including a casing in which a support supports a quartz crystal which vibrates in sine-wave manner at least proximate a fixed frequency; said apparatus comprising transducer means to pick up low magnitude, high frequency sine-wave sound produced directly by said support and corresponding to the vibrations of said crystal and to convert the same in entirety into a sine-wave electrical signal of corresponding frequency, electronic circuit means coupled to said transducer means to measure said frequency, said circuit means including pre-amplifier means coupled to said microphone, filter means coupled to said pre-amplifier means for filtering through only those frequencies at least substantially corresponding with those of said quartz crystal, and amplifier means coupled to said filter means, and indicating means coupled continuously to said amplifier means.

**3,864,958**

## DIRECT DISPLAY OF THERMAL CONDUCTIVITY PROFILE FOR NON-DESTRUCTIVE TESTING OF INSULATED ROCKET MOTOR CASES

**David R. Dreitzler, Huntsville; Charles R. Moore, Hazel Green, and Lawrence B. Thorn, Madison, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 10, 1973, Ser. No. 405,231**
**Int. Cl. G01n** *25/72*
**U.S. Cl. 73—15 R** **2 Claims**




1. An easily interpretable display of insulation flaws system comprising an insulated object to be examined; radiation sensing means positioned such that a small area of the insulated object will be sensed at one point in time; moving means connected to said insulated object and said radiation sensing means for moving them relative to each other such that said radiation sensing means will scan a predetermined area of said insulated object; display means connected to an output of said radiation sensing means such that the area scanned will be displayed; said display means is an oscilloscope having X and Y scan and input terminals said radiation sensing means having an output connected to the Z input terminal of said oscilloscope such that it will intensity modulate the display of said oscilloscope; raster circuit means being connected to said X and Y input axes such that the area of display will correspond to the area scanned on said insulated object; said radiation sensing means is an infrared detector and said insulated object is a thin-wall insulated rocket motor case; said raster circuit means comprises a waveform generator having a long gentle slope output and a vertical sweep circuitry having a sawtooth output; amplifiers connected between the raster circuits and the X and Y input terminals of the oscilloscope; said vertical sweep circuitry comprises a constant current source connected directly to said Y axis; a capacitor connected in parallel with said constant current source; a reset switch being connected in parallel with said constant source and said capacitor; and synchronizing means connected to said reset switch and said moving means such that it will be periodically closed for a short period of time in synchronism with the scan of the insulated object.

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**3,864,959**

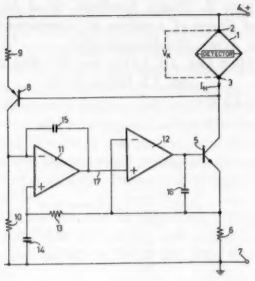
## THERMAL CONDUCTIVITY DETECTOR APPARATUS

**John Marshall MacDonald, Cambridge, England, assignor to Pye Limited, Cambridge, England**

**Filed Dec. 16, 1971, Ser. No. 208,648**
**Int. Cl. G01n** *25/36*
**U.S. Cl. 73—27 R** **15 Claims**

1. Thermal conductivity detector apparatus comprising, at least one sensing filament and at least one reference filament connected in a katharometer bridge, circuit, supply means coupled to the katharometer bridge input supply terminals for supplying heating current to said katharometer bridge circuit, and detector means for detecting an unbalance in said katharometer bridge circuit between the resistance of said sensing and reference filaments and for providing an output signal representative of said unbalance, said supply means including current regulating means connected in series circuit with the

katharometer bridge circuit and which regulates the heating current supplied to said katharometer bridge in response to variations in the resistance of said katharometer bridge appearing between the bridge input supply terminals such a way that the mean of the temperatures of said sensing and said reference filaments is maintained substantially constant despite variations in the magnitude of the detector unbalance.



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**3,864,960**

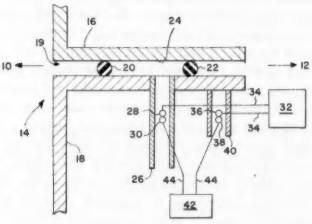
## VACUUM LEAK DETECTOR

**James C. Fletcher, Administrator of the Natl. Aeronautics and Space Administration with respect to an invention of, and George P. Kazokas, Santa Monica, Calif.**

**Filed Oct. 2, 1973, Ser. No. 402,868**

**Int. Cl. G01m** *3/26*

**U.S. Cl. 73—46** **6 Claims**



**1.** An apparatus for the detection of vacuum leaks at a main seal between a first member and a second member which together form a barrier between a gaseous atmosphere and a vacuum environment comprising;

secondary seal means attached along the expected leak path enclosing a chamber on the vacuum side of the main seal, one boundary of which is the main seal;

gas flow exit means connecting said chamber to said vacuum environment;

first heat generating means mounted in said vacuum environment within said gas flow exit whereby gas leaking past the main seal vents to the vacuum environment by flowing past said heat generating means;

first temperature measurement means mounted adjacent to said first heat generating means whereby the temperature of said first heat generating means is measured;

second heat generating means of identical characteristics to said first heat generating means mounted in said vacuum environment whereby said second heat generating means is isolated from said gas flow exit means;

second temperature measurement means of identical characteristic to said first temperature measurement means mounted adjacent to said second heat generating means whereby the temperature of said second heat generating means is measured; and

temperature comparison means interconnected to said first and second temperature measurement means for comparing the temperatures of said first heat generating means and said second heat generating means indicating the rate of gas flow cooling occuring at first heat generating means and thereby yielding a measure of gas leak rate past said main seal.

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**3,864,961**

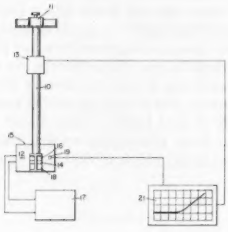
## MICRO-PARALLEL PLATE PLASTOMETER AND VISCOMETRY METHOD

**Lawrence C. Cessna, Jr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.**

**Filed July 30, 1973, Ser. No. 383,756**

**Int. Cl. G01n** *11/00*

**U.S. Cl. 73—54** **6 Claims**



**1.** A method for obtaining data for calculating viscosities of very small samples of material comprising the steps of:

a. providing a disc-shaped sample of less than one gram, said sample having a diameter to thickness ratio of at least 10:1;

b. placing said sample between spaced coaxial cylinders having minimum diameters equal to the diameter of said specimen;

c. compressing said sample under constant uniform pressure;

d. heating said mample with a temperature schedule which consists of heating rates in the range of from 0°C./min. to 20°C./min.; and

e. continuously recording the temperature and thickness of said sample with respect to time.

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**3,864,962**

## CAPILLARY VISCOSIMETER

**John-Hermann Stark; Jean-Claude Lambiel, both of Marly, and Markus Jungo, Tafers, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Apr. 10, 1973, Ser. No. 349,842**

**Claims priority, application Switzerland, Apr. 10, 1972, 5265/72**

**Int. Cl. G01n** *11/06*

**U.S. Cl. 73—55** **17 Claims**

**1.** A capillary viscosimeter, comprising:

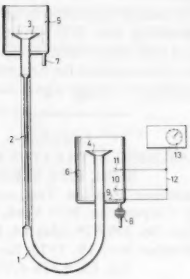
a capillary through which liquid is arranged to flow during a viscosity measurement;

an overflow vessel connected upstream of said capillary and adapted to be supplied with an excess of said liquid during said viscosity measurement;

a discharge overflow vessel connected downstream of said capillary and arranged to discharge liquid which has passed through said capillary by overflow;

a measuring vessel positioned to receive the overflow from said discharge overflow vessel;

means within said measuring vessel for defining and sensing a lower and a higher liquid level within said measuring vessel; and



time measuring means connected to said level defining and sensing means for measuring the time interval required for the liquid level in said measuring vessel to rise from said lower to said higher level.

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**3,864,963**

**METHODS AND DEVICES FOR MEASURING INSTANTANEOUSLY A MEAN PRESSURE IN A FLUID MEDIUM**

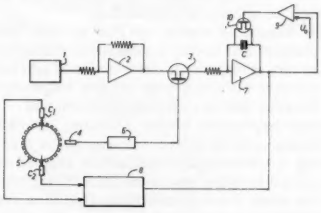
**Jean-Pierre Rivere, Billancourt, France, assignor to Regie Nationale des Usines Renault, Billancourt and Automobiles Peugeot, Paris, both of, France**

**Filed Sept. 18, 1973, Ser. No. 398,490**

**Claims priority, application France, Sept. 27, 1972, 72.34184**

**Int. Cl. G01m** *15/00*

**U.S. Cl. 73—115** **6 Claims**



1. A method for measuring a mean pressure in a fluid medium in synchronism with the rotation of an internal combustion engine, comprising the steps of:

measuring instantaneous values of pressure in said fluid medium;

converting said instantaneous measured pressures into an analog electrical signal;

sampling said analog signal at a pulse rate synthronized with the rotation of said engine;

integrating said sampled signal in an integrator to convert the voltage amplitude of said sampled signal into a time value to obtain an accurate measurement of the pulse information in its shortest period;

discharging an integrating capacitor in said integrator;

counting, in a counter circuit, clock pulses during the constant current discharge time of said integration capacitor; storing clock pulses counted during said discharge time in a buffer memory; and

resetting said counter circuit and said integrator upon completion of said counting of said clock pulses.

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**3,864,964**

**METHOD FOR DIAGNOSING MALFUNCTIONS IN INTERNAL COMBUSTION ENGINES**

**Frederick L. Voelz, Orland Park, Ill., assignor to Atlantic Richfield Company, New York, N.Y.**

**Filed Nov. 23, 1970, Ser. No. 92,229**

**Int. Cl. G01m** *15/00*

**U.S. Cl. 73—116** **10 Claims**

1. A method for diagnosing malfunctions of internal combustion engines which result in exhaust gases having unnecessarily high concentrations of carbon monoxide and hydrocarbons comprising:

1. analyzing for the carbon monoxide and hydrocarbon concentrations of the exhaust gases from said engine, said gases being sampled while said engine is being operated in modes (A) and (B), said engine operational modes being at essentially constant no load conditions at normal operating temperatures and (A) on the idle carburetion circuit and (B) on the main carburetion circuit, the engine being operated in modes (A) and (B) in any chronological sequence; and
2. comparing said carbon monoxide and hydrocarbon concentrations, wherein engine malfunctions resulting in an overly-rich air-fuel mixture to said engine are indicated when the carbon monoxide concentration obtained from operational mode (B) exceeds that from operational mode (A) and engine malfunctions resulting in improper fuel combustion are indicated when the hydrocarbon concentration obtained from operational mode (B) exceeds that from operational mode (A); and
3. correcting at least one of said indicated engine malfunctions and thereby reducing at least one of said carbon monoxide and hydrocarbon concentrations in said engine exhaust gases.

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**3,864,965**

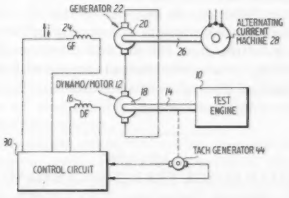
**D. C. DYNAMOMETER SPEED CONTROL CIRCUIT**

**Harold E. Anderson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

**Filed Feb. 5, 1973, Ser. No. 329,398**

**Int. Cl. G01l** *3/22*

**U.S. Cl. 73—134** **12 Claims**




1. A dynamic speed control system for a direct current dynamometer including dynamometer means having a dynamometer field coil and generator means having a generator field coil, the dynamometer and generator means having armatures connected in series, and the dynamometer having an input/output shaft adapted for connection to an engine under test, comprising:

tachometer means for generating a signal having an amplitude related to the speed of the input/output shaft of the dynamometer; and,

means for controlling the current in the dynamometer and generator field coils responsively to the amplitude of said tachometer signal to maintain the rotational speed of the input/output shaft constant, said current controlling means including transistor means continuously variable in the degree of conduction and operably coupled to said tachometer signal for varying the current to the coils to thereby vary the operation of the dynamometer between motoring and braking modes in response to small changes

in the speed of the input/output shaft, said transistor means including a first transistor means for controlling the current in the generator field coil, a second transistor means for controlling the current in the dynamometer field coil, and means for reducing the conduction of one of said transistor means and increasing the conduction of the other of said transistor means responsively to a change in said tachometer signal, the degree of conduction of each of said transistor means being independent of the degree of conduction of the other of said transistor means.

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**3,864,966**

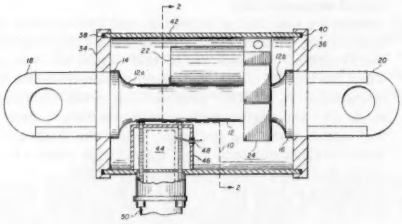
**LOAD TRANSDUCER**

**William K. Seitz, 5342 Windswept, Houston, Tex. 77027**

**Filed Mar. 14, 1973, Ser. No. 341,061**

**Int. Cl. G01l** *1/22*

**U.S. Cl. 73—141 A** **13 Claims**



1. A load transducer for measuring a stress-strain relationship by a change in the longitudinal dimension, comprising in combination:

a load member coupled to a stress producing force resulting in a change in the longitudinal dimension of said member;

a thermal compensation bar;

means for attaching the thermal compensation bar to said load member adjacent one end thereof such that a free end of the thermal compensation bar is at a near midpoint location of the load member; and

strain responsive means fastened to said load member and coupled to said thermal compensation bar proximal a surface of the free end of said compensation bar and generating an electrical output varying with the change in longitudinal dimension of said load member with respect to said compensation bar.

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**3,864,967**

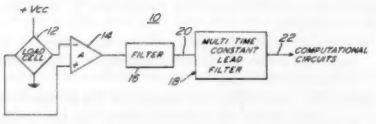
**TIRE LOAD FORCE VARIATION TESTING SYSTEM**

**Ronald W. Krenzel, Eatontown, N.J., assignor to Electronic Associates Inc., West Long Branch, N.J.**

**Filed Aug. 20, 1973, Ser. No. 390,159**

**Int. Cl. G01m** *17/02*

**U.S. Cl. 73—146** **9 Claims**




1. A tire load force variation system for measuring force variation of a tire as a function of rotation comprising:

a. load cell means applied to said rotating tire for transducing a force to a voltage signal having a D.C. component and an effective A.C. voltage signal superimposed thereon;

b. amplifier means connected in series to said load cell means for amplifying said voltage signal;

c. filter means connected in series to said high gain amplifier means for eliminating noise from said amplified voltage signal; and

d. lead filter means connected in series to said filter means for suppressing said D.C. component of said voltage signal said lead filter means including means for varying said filter time constant for compensating for drift of said D.C. component voltage signal during tire testing.

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**3,864,968**

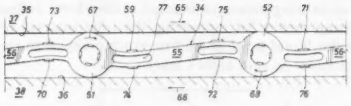
**FORCE-MEASURING APPARATUS FOR USE IN A WELL BORE PIPE STRING**

**Ronald A. Anderson, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Division of Ser. No. 359,829, May 14, 1973, abandoned. This application Nov. 19, 1973, Ser. No. 417,005**

**Int. Cl. E21b** *47/00*

**U.S. Cl. 73—151** **25 Claims**



1. Apparatus adapted for sensing loads acting on a pipe string in a well bore and comprising:

a load-bearing body adapted for coupling to a string of pipe;

a deformable load-responsive member secured in a normal upright position between longitudinally-spaced portions of said load-bearing body and having an unrestrained intermediate portion adapted to deform in response to increases and decreases in axial loads imposed on said load-bearing body tending to move said spaced body portions longitudinally in relation to one another and to tilt in relation to its said normal position in response to torsional loads imposed on said load-bearing body tending to move said spaced body portions angularly in relation to one another;

first transducer means coupled to said load-responsive member and having a measurable characteristic adapted to vary in response to deformation of said load-responsive member occurring upon relative longitudinal movement between said spaced body portions; and

torque-responsive means including second transducer means coupled to said load-responsive member and having a measurable characteristic adapted to vary in response to tilting movements of said load-responsive member away from its said normal position occurring upon relative angular movement between said spaced body portions.

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**3,864,969**

**STATION MEASUREMENTS OF EARTH FORMATION THERMAL CONDUCTIVITY**

**Harry D. Smith, Jr., Houston, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed Aug. 6, 1973, Ser. No. 386,239**

**Int. Cl. E21b** *47/06*

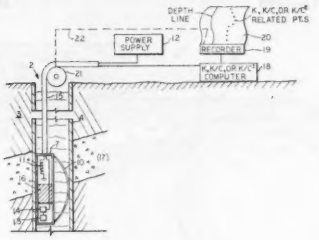
**U.S. Cl. 73—154** **3 Claims**

1. A method for thermally logging a well borehole to obtain indications of a quantity functionally related to the thermal conductivity of earth formations in the vicinity of the borehole, comprising the steps of:

positioning a well logging sonde having a source of thermal energy and a longitudinally spaced therefrom temperature sensitive transducer in position adjacent a formation whose thermal properties are to be obtained so that said source of thermal energy defines the position of a measurement station;

activating said source of thermal energy for a predetermined length of time to impart a quantity of thermal energy into said formation sufficient to increase the temperature thereof at said measurement station to a value elevated above that of its ambient borehole condition;

deactivating said source of thermal energy and moving said well logging sonde to position said temperature sensitive transducer at said measurement station;




measuring the temperature of the earth formations at said measurement station at two points in time separated by an amount sufficient to allow a decrease in temperature of said earth formations; and

combining said two time spaced temperature measurements according to a predetermined relationship to derive an indication of a quantity functionally related to the thermal conductivity of the earth formations at said measurement station.

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**3,864,970**

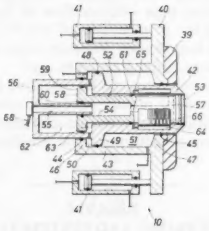
## METHODS AND APPARATUS FOR TESTING EARTH FORMATIONS COMPOSED OF PARTICLES OF VARIOUS SIZES

**William T. Bell, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Oct. 18, 1973, Ser. No. 407,690**

**Int. Cl. E21b** *49/04*

**U.S. Cl. 73—155** **34 Claims**



1. A method for obtaining samples of connate fluids from earth formations traversed by a borehole and having mudcake lining the boreholes wall adjacent thereto and comprising the steps of:

packing-off a portion of said borehole wall adjacent to earth formations therebeyond for isolating said wall portion and said earth formations from fluids in said borehole;

inducting connate fluids from said formations through filtering means having paralleled filter passages with at least a first one of said filter passages being of an enlarged size sufficient to pass particles of mudcake and at least a second one of said filter passages being of a reduced size sufficient to retain loose formation materials for initially drawing mudcake removed from said isolated wall portion on through said first filter passage; and, thereafter,

inducting additional connate fluids from said earth formations through said filtering means for depositing loosened formation particles in a permeable bridge over at least said first filter passage so as to at least reduce the continued flow of connate fluids therethrough and increase the continued flow of connate fluids through said second filter passage.

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**3,864,971**

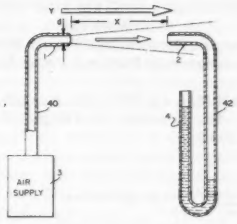
## APPARATUS FOR MEASURING THE VELOCITY OF A FLUID STREAM RELATIVE TO THE APPARATUS

**John W. Tanney, Ottawa, Ontario, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Province of Ontario, Canada**

**Continuation-in-part of Ser. No. 221,226, Jan. 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 835,084, June 20, 1969, abandoned. This application Jan. 28, 1974, Ser. No. 437,759**

**Int. Cl. G01f** *1/00*

**U.S. Cl. 73—194 R** **7 Claims**




1. Apparatus for measuring the velocity of a fluid stream relative to the apparatus, comprising:

a. a fluid jet forming device having a fluid jet orifice,

b. a pressurized fluid source, connected to the device to deliver a fluid thereto of known density and viscosity and cause a turbulent jet of fluid to issue from the orifice at a predetermined velocity along a portion of the flow path of the fluid stream,

c. a receiver means including a receiver mouth facing the orifice, to be pressurized by the dynamic pressure of combined flows from the orifice and the fluid stream, within the area bounded by the receiver mouth,

d. means mounting the receiver means and the device with a turbulent jet forming space extending between them a distance of at least five times the minimum distance across the orifice, and

e. indicating means connected to the receiver means for indicating, in terms of the fluid pressure therein, the velocity of the fluid stream, and wherein,

f. the geometry of the fluid jet orifice is derived from

$R = Vh_n K/\mu$ where, in consistent dimensions

R is the dimensionless Reynolds number and is in excess of 1,700,

V is the velocity of the fluid issuing from the orifice,

K is the density of the fluid issuing from the orifice,

$\mu$ is the viscosity of the fluid issuing from the orifice and,

$h_n$ is the hydraulic diameter obtained from

$h_n = 4A_n/P_n$ where, in consistent dimensions,

$A_n$ is the cross-sectional area of the fluid jet orifice at the outlet, and

$P_n$ is the distance around the perimeter of the fluid jet orifice at the outlet, and,

g. when the device is to face downstream of the fluid stream it has an external geometry defined by its external perimeter enclosing a cross-sectional area less than $A_{on}$ between the limits of a plane located at the outlet of the fluid jet orifice and at the plane parallel thereto located $2h_n$ therefrom, where $h_n$ is the hydraulic diameter previously defined, and $A_{on}$ is derived from

$A_{on} = \pi (2.3\, h_n + Y_n)^2/4$, where, in consistent dimensions, $Y_n$ is the distance between the plane at the outlet of the fluid jet orifice of the device and the plane at which $A_{on}$ is to be defined, and

when the receiver means is to face downstream of the fluid stream it has an external geometry defined by its external perimeter enclosing a cross-sectional area less than $A_{or}$ between the limits of a plane located at the inlet of the receiver mouth and a plane parallel thereto, by

$A_{or} = \pi (3h_r + Y_r)^2/4$, where, in consistent dimensions and within the limit of Y is less than $2h_r$,

$Y_r$ is the distance from the plane at the receiver mouth to the plane at which $A_{or}$ is to be defined,

$h_r$ is the hydraulic diameter of the receiver at its inlet as defined by the relationship

$h_r = 4A_r/P_r$, where

$A_r$ is the area enclosed by the receiver mouth at its inlet, and

$P_r$ is the perimeter of the receiver mouth at its inlet.

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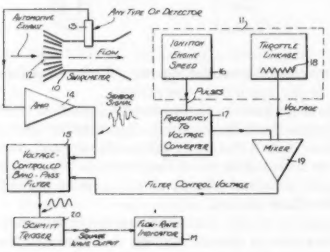
**3,864,972**

## SIGNAL RECOVERY SYSTEM FOR VORTEX TYPE FLOWMETER

**Thomas H. Burgess, Horsham, and Peter J. Herzl, Morrisville, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.**

**Filed Mar. 12, 1973, Ser. No. 340,455**
**Int. Cl. G01f** *1/00;* **G01p** *5/00*
**U.S. Cl. 73—194 B** **8 Claims**




1. A signal recovery system for a vortex-type flowmeter in which the fluid to be measured is directed past a vortex producing element therein to induce fluidic variations whose fundamental frequency is a function of the flow rate, said fluidic variations as well as variations resulting from hydrodynamic noise being detected by a sensor in the form of a pressure or force transducer which yields an electrical signal that varies as a function of frequency; said system comprising:

A. A voltage-controlled band-pass filter coupled to the output of the sensor to transmit only those frequencies which lie within a narrow range whose center frequency is determined by a control voltage applied to the filter, and to attenuate all other frequencies;

B. Means to generate a control voltage having an amplitude related to the velocity of the fluid passing through the flow tube, said means including an amplifier responsive to the sensor signal to produce an output in which a linear relationship exists between frequency and amplitude and means to rectify said amplifier output to produce said control voltage;

C. Means to apply said control voltage to said filter to adjust the band-pass setting thereof so that the center frequency approximately corresponds to said fundamental frequency; and

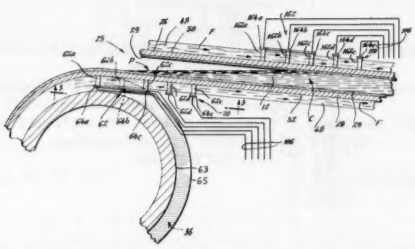
D. Means coupled to the output of the filter and responsive to said fundamental frequency to indicate the flow rate.

**3,864,973**

## METHOD AND APPARATUS FOR DETERMINING THE OPERATING CONDITIONS IN CONTINUOUS METAL CASTING MACHINES OF THE TYPE HAVING A REVOLVING ENDLESS CASTING BELT

**Charles J. Petry, Winooski, Vt., assignor to Hazelett Strip-Casting Corporation, Winooski, Vt.**

**Filed Mar. 22, 1973, Ser. No. 343,884**
**Int. Cl. G01f** *23/22;* **B22c** *19/04;* **B22d** *11/10*
**U.S. Cl. 73—295** **24 Claims**



1. The method of determining the molten metal pool position in the input region of a continuous metal casting machine of the type having at least one endless, flexible, revolving casting belt with a casting surface which engages the molten metal to be cast and a reverse, cooled surface along which is directed a substantially continuous high velocity flow of liquid coolant, the casting surface being covered with a belt coating to insulate and protect the belt from the molten metal and to control the rate of cooling of the molten metal, said method comprising:

predetermining the desired range in operation of the position of the molten metal pool in the input region of the casting machine;

positioning a series of at least two heat sensing detectors in bearing contact with the moving reverse, cooled surface of the casting belt and in upstream-downstream spaced relation with respect to the direction of travel of the belt in respective positions to span the desired predetermined range in pool position;

arranging said detectors to present minimal interference to the continuous high velocity flow of liquid coolant directed along the reverse, cooled belt surface;

insulating said heat sensing detectors from the high velocity flow of coolant rushing by them; and

monitoring the responses of said detectors to changes in the temperature of the moving reverse cooled surface of the belt at the respective upstream-downstream positions of said detectors to determine the position of the molten metal pool.

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**3,864,974**

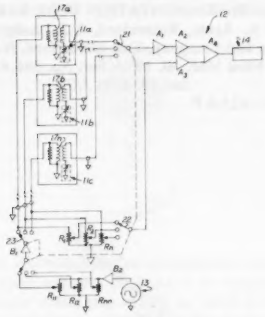
## CAPACITANCE PROBE AND SYSTEM FOR PRECISION MEASUREMENT OF LIQUID LEVEL

**George P. Rauchwerger, 147 Cromart Ct., Sunnyvale, Calif. 94087**

**Continuation-in-part of Ser. No. 105,254, Jan. 11, 1971, Pat. No. 3,710,244. This application Nov. 27, 1972, Ser. No. 309,735**
**Int. Cl. G01f** *23/26*
**U.S. Cl. 73—304 C** **5 Claims**

1. A liquid level measuring system for use in a container comprising an oscillator having one terminal at ground potential, a capacitance probe to be immersed in the liquid to be measured, said probe having a conductor, the lower end of said conductoor being adjacent the bottom of said container, said conductor sheathed by an insulator, the other conductor of said probe comprising the liquid in said container, a transformer having one coil in series with said oscillator and being

at ground potential at the opposite end and a second coil in series with said probe at one end and with a measuring circuit at the other end, said measuring circuit being remote from said probe, said transformer and said probe being located in



close proximity to each other and separated from sid measuring circuit by long wires, said measuring circuit comprising a charge amplifier having its input connected at one end to said second coil.

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**3,864,975**

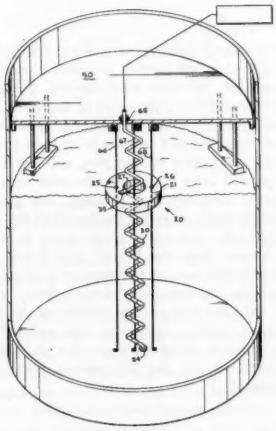
## TEMPERATURE MEASURING APPARATUS

**Redwood L. Springfield, 572 Trianon, Houston, Tex. 77019**

**Filed Apr. 16, 1973, Ser. No. 351,478**

**Int. Cl. G01k *1/14***

**U.S. Cl. 73—341** **5 Claims**



**3.** Temperature measuring apparatus including in combination:

fluid containing vessel having bottom, upright walls, and a floating roof which rises and falls as a function of the level of the fluid in said vessel.

coil, fixed to said bottom and to said floating roof, and adapted to extend outwardly therefrom;

said coil comprising a plurality of thermocouple-cables containing junctions, spirally wrapped around each other; and

constant force extensible spring means fixed to said bottom and to said roof.

**3,864,976**

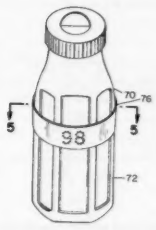
## REUSABLE BOTTLE THERMOMETER

**Robert Parker, Danville, Calif., assignor to Robert Parker Research, Inc., Livermore, Calif.**

**Filed Oct. 31, 1973, Ser. No. 411,592**

**Int. Cl. G01k *1/12***

**U.S. Cl. 73—356** **9 Claims**



**1.** As an article of manufacture, a digital thermometer comprising a laminate sandwich having:

a digital thermometer strip of a transparent base film, a dark mask painted on said base strip leaving transparent areas of alpha-numeric symbols, a plurality of liquid crystal compositions coated over said mask forming a substantially uniform layer, wherein each alpha-numeric designation is covered with a liquid crystal composition having a transition range associated with the alpha-numeric symbol, and a black film backing on said liquid crystal composition layer;

an inner film and an outer film of greater cross-sectional dimension than said thermometer strip, wherein each of said films are water impermeable and said outer film is substantially thicker than said inner film, with said inner and outer films heat bonded together to form an envelope containing said digital thermometer strip, whose edges extend substantially beyond the periphery of said thermometer strip; and

means affixed to said envelope for securing the inner film in good heat exchanging relationship to a surface.

**3.** An article of manufacture according to claim **2**, wherein intermediate said thermometer strip and inner film is a thin metallic film.

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**3,864,977**

## DIVING TIME MEASURING DEVICE

**Karl Leemann, Wehntalerstrasse 142, CH-8057, Zurich, Switzerland**

**Filed May 14, 1973, Ser. No. 360,324**

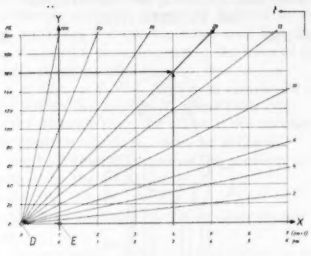
**Claims priority, application Switzerland, May 16, 1972, 7276/72**

**Int. Cl. G01l *7/04*; G01f *23/14***

**U.S. Cl. 73—389** **7 Claims**

**1.** Diving time measuring device for indicating the still available diving time for a diver, with a specific initial gas supply at a specific water diving depth, characterized by a first pressure responsive means responsive to the difference in pressure between the gas supply and the water pressure, which first means converts the change in said pressure difference into a movement of a part of said first means, and that the said part is rigidly connected to a second pressure responsive means that is exposed to the water pressure only, which second means converts the pressure change in the water at different diving depths into a movement of a part of said second means, which part of the second means, due to the rigid connection, in response to a simultaneous change of said pressure difference and water pressure, executes a movement combined of both individual movements, the means being so arranged and connected with each other, that the directions of the individual movements caused by a change in the pressure

difference and water pressure are orthogonal to each other, whereby the position of the said part of said second means indicates the diving time $t$ in accordance with the formula $t = V_G/V_A \cdot P_G/(P_W + 1)$, wherein is $P_G$ the pressure difference



between gas pressure and water pressure as sensed by said first means, $P_W$ the water pressure as sensed by said second means, and $V_G/V_A$ is a constant established by the initial gas supply volume $V_G$ and the amount of gas $V_A$ used by the diver per time unit.

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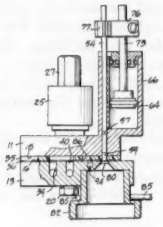
**3,864,978**

**AUTOMATIC ROTARY SAMPLE INJECTION VALVE**

**Thomas M. Stephens, Menlo Park, Calif., assignor to Envirotech Corporation, Menlo Park, Calif.**

**Filed Feb. 19, 1974, Ser. No. 443,873**
**Int. Cl. G01n** *1/10*
**U.S. Cl. 73—422 GC** **6 Claims**



1. A sampling device comprising:

a. a valve body formed of two sections, each of which is constructed and arranged to present a flat face parallel to a corresponding flat face of the other;

b. a lamina-like seal means forming a liquid-tight seal interposed between said faces;

c. means connected to said body assembly to selectively rotate said sections relative to one another from a first position to a second position through a preselected angle while maintaining said faces parallel;

d. a liquid flow inlet and an outlet spaced therefrom, both of which are formed through one of said sections, said inlet and outlet being arranged in fluid-flow communication with said face of that section;

e. passageway means connecting said inlet and outlet in fluid-flow communication with each other across said face of said first section;

f. sample-taking piton means arranged in a cylindrical channel formed in the second of said sections in fluid-flow communication with said flow channel in said first section at said first position of said sections;

g. means constructed and arranged to reciprocate said piston to withdraw a liquid sample of selected volume from said flow channel;

h. an outlet port formed through said first section in fluid-flow communication with said face thereof at said second position for receiving a liquid sample released from said cylinder by said sample-taking piston at said second position of said sections.

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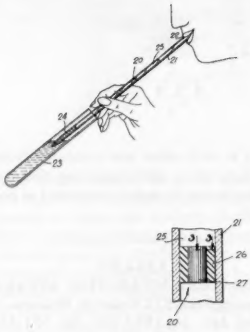
**3,864,979**

**BLOOD SEDIMENTATION TUBE BARRIER**

**Waldemar A. Ayres, Rutherford, N.J., assignor to Becton Dickinson and Company, East Rutherford, N.J.**

**Filed Mar. 30, 1973, Ser. No. 346,423**
**Int. Cl. B01l** *3/02*
**U.S. Cl. 73—425.4 P** **7 Claims**





1. A liquid collection tube comprising; a hollow transparent tube open at the top and bottom, a barrier plug mounted in the tube intermediate the open ends thereof, the plug having a porous portion and being mounted in the tube at a predetermined location so that when the bottom open end is placed in liquid to be collected and suction is applied to the top open end, the porous portion of the plug will permit air to pass therethrough and draw liquid into the tube up to the bottom of the barrier plug and not through the porous portion, thereby automatically stopping the height of the liquid column entering the tube and preventing liquid from progressing above the barrier plug, the barrier plug being cylindrical in configuration with a non-porous portion forming an outer part of the plug and the porous portion forming a central core concentric with the non-porous portion of the plug whereby the non-porous portion engages the side walls of the tube, and the porous portion being formed of a plurality of vertical adjacent filaments and the non-porous portion being of a resilient material.

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**3,864,980**

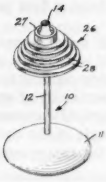
**APPARATUS FOR BALANCING TIRE AND WHEEL ASSEMBLIES**

**Cecil R. Barnes, 101 Elmhurst Dr., Lumberton, N.C. 28358**

**Continuation-in-part of Ser. No. 274,693, July 24, 1972, abandoned. This application Jan. 2, 1974, Ser. No. 430,019**
**Int. Cl. G01m** *1/04, 1/12*
**U.S. Cl. 73—484** **2 Claims**

1. In a bubble balance mechanism for independently indicating areas of imbalance of an unmounted tire and a wheel having a central hub-fitting opening, the balance mechanism including a base with an upstanding post, a head movably balanced on said post about a generally vertical axis, said head having a frusto-conical portion for receiving and supporting

said wheel adjacent to said central opeiing, a spirit level carried by said head, and support means resiliently mounted on said head and vertically movalbe relative thereto: the improvement comprising a balanced body having an upper portion fixed to said support means, said body including a plurality of concentric offset stepped rings extending downwardly and outwardly from said upper portion, each of said stepped



rings being of a size to support substantially the entire bead of an unmounted tire, whereby the bead of an unmounted tire is placed on an appropriate ring so that the spirit level indicates the direction of imbalance of the tire, and thereafter the wheel is mounted on the frusto-conical portion of the head so that the spirit level indicates the direction of imbalance of the wheel.

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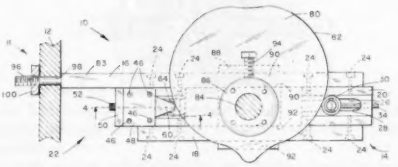
**3,864,981**

## PRETENSIONING APPARATUS FOR CAM-DRIVEN RECIPROCATING SLIDE ASSEMBLY

**Kurt Schlegel, 1 Hastings Rd., Old Westbury, N.Y. 11568**

**Filed June 15, 1973, Ser. No. 370,295**
**Int. Cl. F16h** *25/08*
**U.S. Cl. 74—55** **24 Claims**



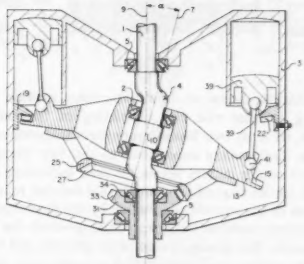
1. Cam-driven reciprocating slide assembly for reciprocating a carriage of a machine, the slide assembly comprising a frame member mounted for free slidable movement along a predetermined linear direction, said frame member including means for connecting the latter to the reciprocable carriage of the machine; a pair of opposed contact rollers defining a space along said predetermined direction for receiving a rotary cam disc therebetween and for spanning opposed peripheral portions of the cam disc, whereby rotary movement of the cam disc with the periphery of the latter in contact with said rollers imparts reciprocatory motion to the slide assembly; a pair of mounting means provided on said frame member each supporting a roller and mounting a respective roller on said frame member, one of said rollers being resiliently mounted for limited movement relative to its associated mounting means along said predetermined direction; and stop means for limiting movement of said resiliently mounted roller in the direction of said other roller, said one roller normally being biassed to an initial position relative to its associated mounting means and normally being maintained in said initial position by said stop means, said cam-receiving space being variable by the yielding movement of said one resiliently mounted roller from said initial normal biassed position, whereby a cam disc disposed in operative relation between said rollers causes said one roller to resiliently yield in response to peripheral surface imperfections on the cam disc.

**3,864,982**

## KINEMATIC MECHANISM FOR THE REVERSIBLE CONVERSION OF RECIPROCATING MOTION TO ROTARY MOTION

**Giulio Martinozzi, Rome, Italy, assignor to Kinespherics, Inc., New York, N.Y.**

**Filed June 12, 1973, Ser. No. 369,053**
**Int. Cl. F16h** *33/00*
**U.S. Cl. 74—60** **3 Claims**



1. A kinematic mechanism for the reversible conversion of rotative motion into reciprocating motion comprising:

a. a base frame,

b. a shaft having an offset section,

c. bearings means to permit the shaft to rotate freely about its cylindrical axis, said bearing means being attached to the frame,

d. a first conical gear with bearing means for mounting said gear on the offset section of the shaft so that it may rotate freely about its axis, the gear being positioned on the offset section whereby its axis intersects the shaft axis at an angle $\alpha$, said gear being positioned with its vitual vertex coinciding with the intersection of said gear and shaft axes, said gear having peripheral teeth and a vertex angle equal to 180 - $\alpha$degrees,

e. a first conical ring gear having a vertex angle equal to 180 -$\alpha$degrees, a base circumference equal substantially to the base diameter of the first conical gear, and teeth with the same pitch as the teeth of the first conical gear, said ring gear being attached to the frame with its axis coinciding with the shaft axis and its virtual vertex coinciding with the intersection of the shaft and first conical gear axes, said ring gear opposing said first conical gear whereby the teeth of the ring gear mesh with the teeth of the first conical gear to constrain it to one degree of freedom when the shaft is rotated,

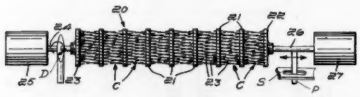
f. a second conical ring gear with peripheral teeth and a vertex angle $\beta$, said gear being attached to one side of the first conical gear with its axis and virtual vertex coinciding with the axis and virtual vertex of the first conical gear,

g. a second conical gear with peripheral teeth of the same pitch as the teeth of the second ring gear and bearing means for mounting the gear on the shaft so that it may rotate freely around the shaft said second conical gear having a vertex angle equal to $\beta$-$\alpha$ degrees and base diameter substantially equal to the base diameter of the second ring gear X $\text{Sin}(\beta-\alpha)/\text{Sin}\ \beta$ said second conical gear being positioned on the same side of the first conical gear as is the second ring gear and with its axis coinciding with the shaft axis, and its virtual vertex coinciding with the virtual vertex of the second ring gear, whereby the teeth of the second ring gear mesh with the teeth of the second conical gear and drive it as the shaft rotates.

## 3,864,983
## ROTARY-TO-LINEAR AND LINEAR-TO-ROTARY MOTION CONVERTERS

Stephen C. Jacobsen, 12 Burton St., Arlington, Mass. 02174

Continuation of Ser. No. 289,482, Sept. 15, 1972, abandoned. This application May 8, 1974, Ser. No. 468,215
Int. Cl. F16h 27/02
U.S. Cl. 74—89 17 Claims

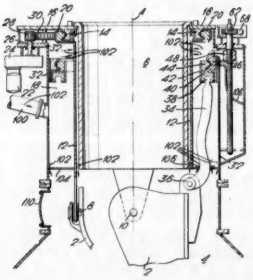


1. A rotary-to-linear or linear-to-rotary motion converter comprising at least one cell consisting of first and second separators, at least two linking members interconnecting the separators, first means connected to the first separator and operable to rotate it, and second means including a member connected to the second separator, said second means opposing rotation of the second separation by the first separator and the connecting member being movable towards the first separator when the first means is operated, said second means also operable to retract said connecting member and the second separator when the first means is inoperative, the first separator then rotating reversely, the linking members being connected to the separators at locations spaced equally from the axis of each separator thus to travel along a circular path if that separator turns, said locations being so spaced with respect to their respective paths that the axes of the separators remain in a substantially constant relationship as one separator turns in response to the turning of the other, said linking members being flexible, at least relative to said connections, and the length of the linking members being less than the square root of the product of the diameters of said paths to render said cell stable in use.

## 3,864,984
## CONTROL DEVICE FOR A DISTRIBUTOR CHUTE IN A SHAFT FURNACE, PARTICULARLY A BLAST FURNACE

Edouard Legille, Luxembourg City, Luxembourg, assignor to S.A. Des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Oct. 5, 1973, Ser. No. 403,900
Claims priority, application Luxembourg, Oct. 11, 1972, 66273
Int. Cl. F16h 27/02
U.S. Cl. 74—89.15 13 Claims

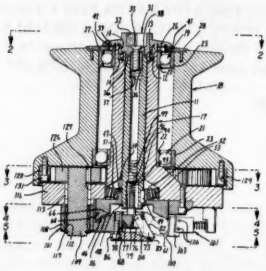


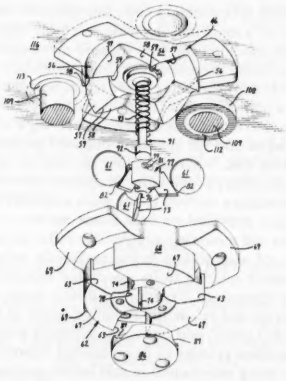
1. In a furnace, the furnace being provided with a material feed spout and a movable distribution chute arranged to receive material from the spout, an improved chute position control comprising;
a rotary casing;
means for causing rotation of said casing;
means pivotally connecting the first end of the distribution chute to said casing;
rod means having a first end coupled to the distribution chute;
vertically movable angular drive means, said vertically movable drive means being fixed in position on the furnace and including at least a first vertically movable output member;
means coupling said drive means output member to the second end of said rod means; and
means for transmitting motion to said vertically movable drive means independently of and during rotation of said casing whereby vertical movement of said rod means to adjust the pitch angle of the chute may be accomplished independently of the rotary motion of the chute.

## 3,864,985
## DRIVE TRANSMISSION

Walter W. Bradley, 1525 Hess Rd., Redwood City, Calif. 94003, and Charles S. Blair, Jr., 226 Stockbridge Ave, Atherton, Calif. 94025

Continuation-in-part of Ser. No. 229,880, Feb. 28, 1972, abandoned. This application Jan. 26, 1973, Ser. No. 326,577
Int. Cl. F16d 27/10
U.S. Cl. 74—125.5 15 Claims





1. A drive transmission comprising:
a housing;
an elongated drive shaft extending longitudinally of said housing;

means operatively connected to one end of said shaft for rotating said shaft about its longitudinal axis;

translating means including a cam having at least a pair of spaced lobes operatively engaging the other end of said shaft and said cam being rotatable therewith whereby rotary motion of said shaft is translated into motion transverse to the axis of rotation of said shaft;

at least a pair of spaced dogs each comprising an arm having one end mounted on said housing for rotation about an axis parallel to the axis of rotation of said shaft and extending in a direction transverse to the axis of rotation of said shaft to a free end;

biasing means operatively engaging both said housing and said dogs for biasing said free ends of said arms of said dogs in a direction substantially inwardly of said housing and toward the axis of rotation of said shaft into engagement with said translating means; and

means associated with said translating means for varying the amount of rotation thereby of each of said arms of said dogs about its axis of rotation.

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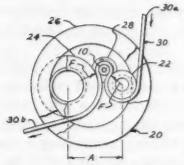
**3,864,986**

**AUTOMATIC BELT TIGHTENER**

**John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Nov. 19, 1973, Ser. No. 416,730**
**Int. Cl. F16h** *7/00, 7/12, 7/10*
**U.S. Cl. 74—226** **9 Claims**




1. In a belt drive mechanism for transmitting torque between a driving rotatable member and a driven rotatable member through a drive belt, an automatic belt tightener comprising:

a freely riding, roller assembly pivotable about the driving member and including two rollers having their longitudinal axes of rotation parallel and spaced a fixed maximum distance apart, the driving member having its longitudinal axis of rotation parallel to the rotational axes of the rollers and arranged in a wedge-like relationship therebetween; and

the drive belt passing partially around a first of the rollers, between the first roller and the driving member and more than half-way around the circumference thereof, exiting between the driving member and a second of the rollers to pass partially therearound, such that as torque is applied to the driving member the respective rollers will automatically exert radial forces against the belt normal to the driving member effectively wedging the belt against the driving member for effecting driving engagement therebetween.

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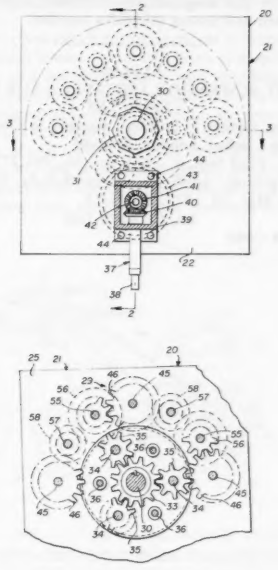
**3,864,987**

**CHANGE SPEED GEARING**

**Guiseppe Vigneri, 102 Warwick St., Newark, N.J. 07105**

**Filed Oct. 11, 1973, Ser. No. 405,642**
**In... Cl. F16h** *3/34*
**U.S. Cl. 74—354** **7 Claims**

1. In a change speed gearing, a casing including spaced parallel wall members, divider plates interposed between said wall members, an input drive shaft mounted in said casing, a pair of spaced apart sleeves mounted on said drive shaft, a plurality of output shafts journaled in said casing, and a gear train including coacting shafts and gears for selectively operatively connecting said drive shaft to said output shafts, and means for selectively modifying the output-input speed of the respective drive and output shafts.

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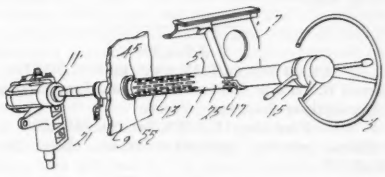
**3,864,988**

**ENERGY ABSORBING STEERING COLUMN**

**Don Adams, III, Ferndale, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed May 14, 1973, Ser. No. 360,295**
**Int. Cl. B62d** *1/18*
**U.S. Cl. 74—492** **3 Claims**




1. An energy absorbing steering column comprising a steering wheel, a steering shaft connected to said wheel and adapted to extend through an opening in a floorboard of a vehicle, a tubular jacket surrounding said shaft between said floorboard and said steering column, and a die means inside the lower end of said tubular jacket, said die means being connected to said floorboard, said die means, when a force of predetermined magnitude is applied to the upper end of said column, causing said jacket to fold back upon itself, thereby absorbing energy, a plurality of fasteners connecting said die means to said jacket, said fasteners being adapted to shear when the force of the predetermined magnitude is applied to the upper end of the column, said jacket having a plurality of longitudinally extending rows of longitudinal slots, said rows being spaced apart from one another around the perimeter of

said jacket, each of said slots having a curved end portion, said slots in each of said rows being separated by relatively short webs, said jacket, between said rows of slots, having a plurality of relatively flat longitudinally extending sides, said webs being curved and joining said sides together.

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**3,864,989**

## FRONT SUSPENSION ASSEMBLIES FOR MOTOR VEHICLES

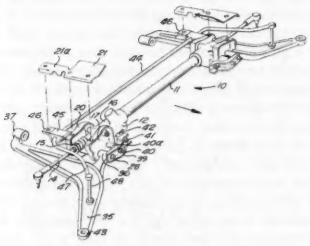
**Clive Jones, Coventry, England, assignor to Chrysler United Kingdom Limited, London, England**

**Filed Sept. 4, 1973, Ser. No. 394,273**

**Claims priority, application Great Britain, Oct. 2, 1972, 45298/72; Mar. 28, 1973, 14891/73**

**Int. Cl. B62d** *1/20*

**U.S. Cl. 74—498** **6 Claims**



**1.** A front suspension assembly for a motor vehicle comprising:

a. a rack and pinion steering mechanism having a rigid elongate housing having opposing ends and a rack mounted for sliding movement in the housing;

b. rigid mountings secured at both ends of the housing for rigidly securing the housing across a vehicle frame or body;

c. two wheel support arms each having a pair of axially aligned pivot mountings;

d. means to mount one of the pivot mountings of each of the two wheel support arms on the two rigid mountings for the rack housing respectively; and,

e. means to mount the other pivot mountings of the two wheel support arms on further parts of the vehicle frame or body.

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**3,864,990**

## GEAR TORQUE TRANSMISSION BOXES

**Gerard H. Lacoste, St-Maur des Fosses, France, assignor to Herwaythorn S.A., Paris, France**

**Filed May 15, 1973, Ser. No. 360,480**

**Claims priority, application France, May 25, 1972, 72.18621**

**Int. Cl. F16h** *57/02*

**U.S. Cl. 74—606 R** **8 Claims**

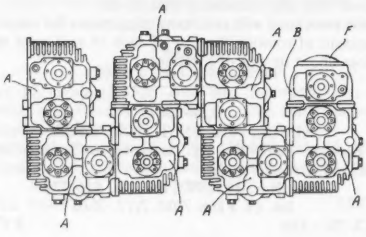
**1.** A set of parts for making up different gear torque transmission boxes, which set of parts comprises:

a principal part A comprising a casing containing two shafts supporting gear wheels and having an upper opening, with four identical side openings surrounding the four shaft ends,

a secondary part B comprising a casing containing a shaft supporting at least one gear wheel and having an upper opening and a lower opening which are identical with one another and identical with the upper opening of the principal part A, means at said upper and lower openings for attachment of part B to part A at said upper opening, also two side openings surrounding the two shaft ends, these side openings being identical with one another and identical with the four openings of the principal part A,

a part C constituting a shaft exit with dog, comprising a bearing, a section of shaft supported by the bearing having a first end projecting from the bearing and a coupling plate fixed on this end, a second internal end supporting a dog device, a means of operating the dog device which is accessible from the outside the bearing, said bearing having an opening and means allowing it to be fixed to any one of the six openings surrounding the shaft ends of the principal part A and the secondary part B,

a part D constituting a simple shaft exit, composed of a jacket having a first opening and a second opening opposite to it, a coupling plate projecting from an opening in the jacket and extending to the interior of the latter, means at the other opening in the jacket enabling it to be



fixed to any one of the six openings surrounding the ends of the shafts of the principal part A and of the secondary part B,

a part E constituting a shaft exit with take-off for tachometer, similar to part D, and including an extended internal portion provided with a gear wheel and a further extended jacket having a side opening which is closed by a supporting bearing containing a shaft fitted at its inner end with a pinion meshing with the gear wheel,

a part F constituting a casing cover with means for fixing it to any one of the upper and lower openings of the parts A and B, and

a part G constituting a shaft end cover with means for fixing it to any one of the six side openings of the parts A and B.

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**3,864,991**

## FLUID PRESSURE CONTROL SYSTEM FOR A COMPOUND TRANSMISSION COMPRISING AN ADJUSTABLE HYDROSTATIC TRANSMISSION PART AND A SECONDARY MECHANICAL LOAD CHANGE-OVER TRANSMISSION

**Siegfried Nembach, Neu-Ulm, Germany, assignor to Hydromatik GmbH, Ulm, Danube, Germany**

**Filed July 23, 1973, Ser. No. 382,044**

**Claims priority, application Germany, July 31, 1972, 2237595**

**Int. Cl. F16h** *47/04*; **B60k**

**U.S. Cl. 74—687** **3 Claims**

**1.** A control for a compound transmission of the kind comprising an adjustable hydrostatic transmission part and a secondary mechanical load changeover gear part, and in which the pump and/or the hydromotor of the hydrostatic transmission part is adjusted by a displacement volume adjusting member by means of a control oil pressure which is variable by the control, and the control clutches of the load changeover transmission part are actuated against spring forces by means of a shift control unit with shift oil pressure which can be turned on or off, and the control comprises an adjustable throttle point for adjusting the control oil pressure, said control comprising,

a shift control unit having a slide piston moveable within the shift control unit to control the flow of the shift oil to the

control clutches of the mechanical load changeover gear part,

shift oil conduits for conducting oil from the shift control unit to the control clutches,

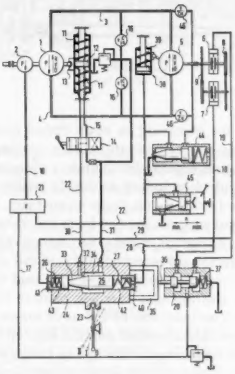
a throttle slide control unit having,

two fixed abutments,

first and second moveable members which are moveable relative to each other and in relation to the two fixed abutments and which are effective to form an adjustable throttle point between the two members.

the first moveable member delimiting two pressure chambers in coaction with the two fixed abutments,

each pressure chamber being connected with one of the shift oil conduits of the control clutches for the load change-over gear, and



wherein, when one of the pressure chambers is supplied with pressure, said first moveable member abuts against one of the fixed abutments to determine its starting position in the adjustable throttle point for subsequent adjustment of the control oil pressure which determines the displacement volume of the hydrostatic transmission part, and

wherein the second moveable member is adjustable from the outside and is coupled with the slide piston of the shift control unit for the control clutches so that adjustment of the second moveable member to displace the slide piston and produce a speed shift of the mechanical gear part simultaneously adjusts the throttle point to vary the displacement of the hydrostatic transmission part in reverse ratio to the transmission jump caused by the mechanical gear shift.

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**3,864,992**

## LIMITED SLIP DIFFERENTIAL HAVING SHAFT LOCKING AND CLUTCH ACTUATING MEANS

**Richard H. Lovdahl, Dearborn Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 31, 1973, Ser. No. 365,545**

**Int. Cl. F16h** *1/44, 1/40*

**U.S. Cl. 74—711** **2 Claims**

**1.** A differential drive mechanism comprising, in combination:

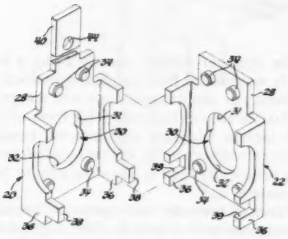
a rotatable housing having a plurality of openings therethrough;

a pair of oppositely extending rotatable shafts extending through a pair of said openings, each of said shafts having an inner end within said housing with a circumferential groove near said inner end;

a side gear axially movable on each of said shafts within said housing outward of said groove;

clutch means between each of said side gears and said housing actuable by outward movement of said side gears;

shaft locking and clutch actuating means comprising a pair of members between said side gears and spring means between said members biasing said members and side gears outward to actuate said clutch means, said members having aligned keyhole-like openings therethrough, said keyhole-like openings having larger portions adapted for insertion of said inner shaft ends therethrough with said members in a first position and smaller portions adapted for engagement of said circumferential grooves for retention of said shaft ends with said members in a second



position, said members having mutually engaging arms with interlocking means to cause said members to move together between said first and second positions but allow biasing of said members away from one another by said spring means, one of said members having tab means projecting through another of said openings in said housing whereby said members can be moved between said first and second position; and means to lock said tab means on the outside of said housing to hold said members in said second position.

**2.** An axle shaft retention and clutch actuating device adapted for use in a limited slip differential drive mechanism having a rotatable housing with a plurality of openings therethrough, a pair of oppositely extending rotatable axle shafts extending through a pair of said openings, an axially movable side gear carried on each of said axle shafts within said rotatable housing for rotation with said axle shafts and clutch means between each of said side gears and said housing actuable by outward movement of said side gears, each of said axle shafts having a circumferential groove thereon between said side gears, said axle shaft retention and clutch actuation device comprising, in combination:

a pair of members for placement between said side gears and spring means between said members biasing said members and side gears outward to actuate said clutch means, said members having aligned keyhole-like openings therethrough, said keyhole-like openings having larger portions adapted for insertion of said axle shafts therethrough with said members in a first position and smaller portions adapted for engagement of said circumferential grooves for retention of said axle shafts with said members in a second position, said members having arms projecting toward each other, said arms having interlocking means comprising at least one slot in an arm of one member and at least one tab in an arm of the other member, said tab adapted for insertion in said slot to cause said members to move together between said first and second positions but allow outward biasing of said members by said spring means, one of said members having another tab projecting through another of said openings in said housing whereby said members can be moved between said first and second position, said axle shaft retention and clutch actuating device further comprising

means outside said housing for locking said tab to said housing with said members in said second position.

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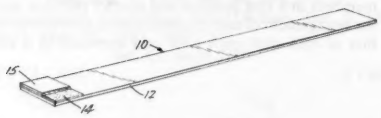
**3,864,993**
**FILM RETRIEVER**
**Gary L. Hovind, Menominie, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Apr. 4, 1974, Ser. No. 457,783**
**Int. Cl. B25b *27/00***
**U.S. Cl. 81—3 R** **4 Claims**




1. A film retriever suitable for retrieving a free end of a convolutely wound film from inside a cylindrical cassette via an exit opening in said cassette edge wall comprising:

a thin flexible strip of material being from about 0.0015 to 0.006 inch in thickness, said material being sufficiently flexible to conform to the internal wall of the cassette but being sufficiently rigid to allow the strip to be forced into the cassette; and

a thin layer of normally tacky pressure sensitive adhesive adjacent one end of said flexible strip, said layer being about 3 to 10 mils thick and having sufficient structural integrity to resist gumming and rolling when inserted into the cassette and being sufficiently adherent to pull the end of the film through the exit opening in said cassette.

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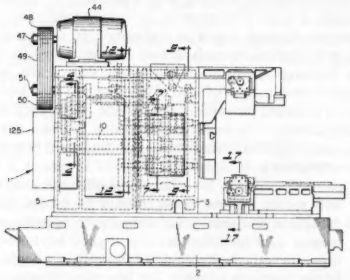
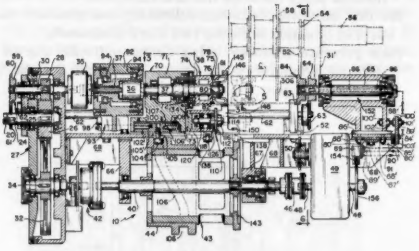
**3,864,994**
**MULTIPLE SPINDLE MACHINE WITH VARIABLE SPEED DRIVE**
**Philip Henry White, Claremont, N.H.**
**Filed Feb. 24, 1969, Ser. No. 801,497**
**Int. Cl. B23b *9/10***
**U.S. Cl. 82—3** **14 Claims**



1. A multiple spindle machine comprising a spindle carrier, a plurality of spindle shafts rotatably mounted in said spindle carrier, means mounting said spindle carrier for indexing movement between a plurality of work stations, a main drive shaft, means for rotating said main drive shaft at a given speed, and drive means including a plurality of fluid operated clutch means associated with each of said spindle shafts and said main drive shaft for selectively independently driving said spindle shafts in one direction at any one of at least three different speeds during rotation of said main drive shafts at any given speed, and additional fluid operated clutch means associated with said spindle shafts and drive shaft for selectively independently driving said spindle shafts in the reverse direction.

**3,864,995**
**CAN TRIMMER DEVICE**
**Cornelis Langewis, Walnut Creek, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.**
**Continuation-in-part of Ser. No. 326,159, Jan. 24, 1973, Pat. No. 3,802,363. This application Dec. 11, 1973, Ser. No. 423,716**
**Int. Cl. B23b *3/06, 3/04, 5/14***
**U.S. Cl. 82—54** **25 Claims**



1. A device for trimming an open ended metal can and the like comprising the combination of a carriage, a rotatable outside cutter and a rotatable mandrel mounted on said carriage, said mandrel including an inside cutter and rigid anvil means provided with a can support surface, a rotatable tail stock holder and support spaced from but axially aligned with said mandrel, conveyor means for selectively supplying an open ended can to said mandrel and said tail stock holder and support, drive means synchronized with said conveyor means for selectively shifting said carriage relative to said conveyor means to effect an insertion of the anvil means along with the inside cutter a relatively small amount into an open ended can supplied to the trimming device by the conveyor means and to cause a displacement of the open ended can relative to said conveyor means and a bottoming of the can upon and against said tail stock holder and support, means for moving said outside cutter into cutting contact with a selected portion of the sidewall of the can and along a cutting plane located in offset relation to said inside cutter and the can support surface of the anvil means when the can is displaced from the conveyor means so as to produce a uniform nonspiral trimming and severing of the entire ragged open end of the can from the remainder of the can and biasing means for holding the outside cutter in the said cutting plane and relative to said selected portion of the can sidewall during the full trimming operation to effect said uniform and non-spiral trimming of the can sidewall.

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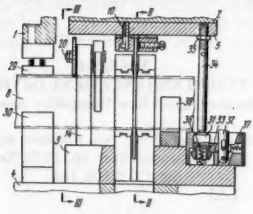
**3,864,996**
**DIE FOR CUTTING PIPES**
**Anatoly Sergeevich Morgolenko; Gennady Dmitrievich Selivanov, both of ulitsa Chkalova, 15; Igor Grigorievich Fedosenko, 602 mikroraion, 51, kv. 206; Vadim Grigorievich Kononenko, ulitsa Chkalova, 15; Vladimir Vasilievich Filippov, ulitsa Darvina, 7, kv. 24, all of Kharkov; Leonid Georgievich Lushnikov, ulitsa Michurina, 17, kv. 17, Krasnoyarsk, and Zoya Alexandrovna Moiseeva-Smirnova, Moskovskoi oblasti, ulitsa Gagarina 38, kv. 26, Kaliningrad, all of U.S.S.R.**
**Filed Jan. 18, 1974, Ser. No. 434,564**
**Int. Cl. B23d *21/00***
**U.S. Cl. 83—5** **2 Claims**

1. A die for cutting pipes comprising: an upper plate; a lower plate; two bed dies for clamping the pipe being cut which are mounted on said lower plate; a flat V-shaped cutter fixed to said upper plate and adapted to penetrate between said bed dies; means providing the preliminary formation of a groove on the pipe surface at the point of cutting by said cutter, said means being mounted on said lower plate and

operatively connected to said upper plate; a disc cutter of said means providing the preliminary formation of the groove rotatable in a plane parallel with the plane of movement of said flat cutter, the toothed sector of said disc cutter being defined by radiuses (R and r) which differ from each other by



an amount of the groove depth; the number of teeth of said disc cutter being determined based upon the condition of removal of minimum layer of material with one tooth; a recess made on said disc cutter, the surface of the recess being in equally spaced relation to the pipe surface for longitudinal displacement of the pipe to under said flat cutter.

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**3,864,997**

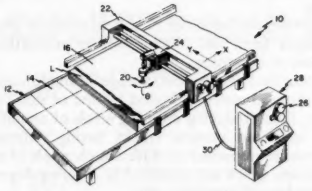
**SYSTEM AND METHOD FOR CUTTING PATTERN PIECES FROM SHEET MATERIAL**

**David R. Pearl, West Hartford, and Samuel Clifford Robison, Manchester, both of Conn., assignors to Gerber Garment Technology, Inc., East Hartford, Conn.**

**Division of Ser. No. 314,144, Dec. 11, 1972, Pat. No. 3,803,960. This application Feb. 6, 1974, Ser. No. 439,999**

**Int. Cl. D06h 7/00; B26d 1/10**

**U.S. Cl. 83—49** **5 Claims**



**1.** A method of cutting closely spaced pattern pieces from sheet material comprising the steps of: advancing a cutting tool in cutting engagement with the sheet material along one portion of a pattern piece contour in a given direction about the pattern piece until the cutting tool reaches a point closest to a previously cut contour of an adjacent piece; advancing the cutting tool in cutting engagement with the sheet material along another portion of the pattern piece contour toward said point in the opposite direction about the pattern piece until the cutting tool reaches said point; and reducing the rate of advancement of the cutting tool as the tool approaches said point in at least one of said directions.

**3,864,998**

**METHOD FOR THE CUTTING OF A YARN TRAVELLING IN A TUBE BY MEANS OF A FLUID**

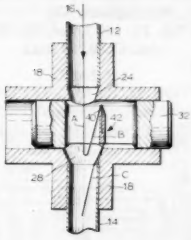
**Jean-Claude Hautemont, Gif-sur-Yvette, and Rolland Sartori, Roanne, both of France, assignors to Rhone-Poulenc-Textile, Paris, France**

**Division of Ser. No. 375,068, June 29, 1973, abandoned. This application June 4, 1974, Ser. No. 476,276**

**Claims priority, application France, June 26, 1972, 72.23275; Apr. 9, 1973, 73.12986**

**Int. Cl. B26d 7/00; B65h 51/16**

**U.S. Cl. 83—53** **3 Claims**



**1.** A process for cutting yarn transported continuously at high speeds by fluid under pressure through a conduit comprising transporting the travelling yarn past movable cutting means located in the vicinity of the path of the yarn within said conduit, said cutting means having a cutting blade, and moving said cutting blade into contact with said travelling yarn whereby the yarn is deflected from its normal path and severed through the pressure it exerts upon said cutting blade created by the pulling force of the fluid under pressure.

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**3,864,999**

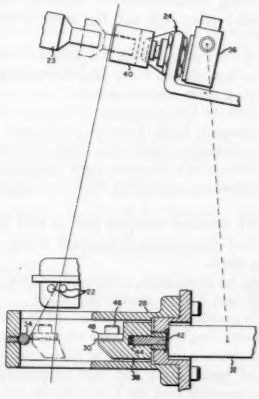
**DOFFING CUTTER WITH REMOTE PICKUP**

**John Frederick Charles, Camden, S.C., and Carl Joseph Markovchik, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed June 5, 1973, Ser. No. 367,342**

**Int. Cl. B26d 5/12**

**U.S. Cl. 83—100** **2 Claims**



**1.** In a yarn handling system for forwarding a running threadline that includes a pneumatically operated portable yarn sucker gun having a yarn inlet end and a yarn cutting device adjacent said threadline, to cut the threadline and

cause the incoming cut end of the threadline to be picked up by the sucker gun, the improvement comprising: a remote actuator for indirectly initiating operation of said cutter located upstream from said cutter adjacent the threadline, said actuator having a slotted recess facing said threadline for receiving said yarn inlet end and through which the threadline passes during the cutting operation, said actuator being operative for actuation of said cutter when said inlet end engages said slotted recess.

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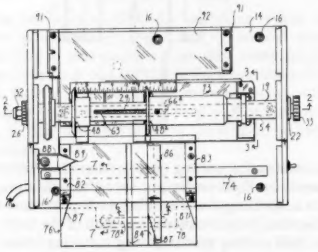
**3,865,000**

## APPARATUS FOR SLITTING SHEET MATERIAL

**Eugene T. Stafford, Birmingham, Ala., assignor to Dixie Type and Supply Co., Birmingham, Ala.**

**Filed Feb. 21, 1973, Ser. No. 334,282**
**Int. Cl. B26d** *3/12*
**U.S. Cl. 83—121** **1 Claim**



1. In apparatus for slitting sheet material comprising:
a. separate plates each having an upper supporting surface and a depending edge portion extending to an elevation below said supporting surface with said depending edge portion of one said plate being spaced laterally from said depending edge portion of the other said plate,
b. a hollow supporting shaft,
c. at least two laterally spaced rotary slitters mounted for rotation with said hollow supporting shaft alongside the laterally spaced depending edge portions with each rotary slitter having an annular cutting edge at the periphery thereof defined by a beveled surface tapering toward and intersecting a flat surface which extends at right angles to said supporting surface with the included angle between said beveled surface and said flat surface being approximately 30°,
d. each said rotary slitter being supported for rotation with said flat surface spaced from said depending edge a distance ranging from approximately 0.001 inch to 0.005 inch and with the lower portion of said cutting edge at an elevation ranging from approximately one sixty-fourth inch to one-sixteenth inch below said supporting surface,
e. an inner externally threaded shaft mounted for rotation within said hollow supporting shaft and extending axially thereof,
f. a sleeve-like member carrying one of said rotary slitters and mounted for sliding movement along said hollow supporting shaft,
g. there being an elongated, axially extending slot through one side of said hollow supporting shaft,
h. an inwardly projecting member carried by said sleeve-like member extending through said elongated slot between the threads on said inner shaft so that upon relative rotation of said inner shaft and said supporting shaft said sleeve-like member and the rotary slitter carried thereby is moved axially along said supporting shaft,
i. means for imparting relative rotary movement between said inner shaft and said supporting shaft,
j. means operatively connecting one of said plates to said sleeve-like member with a sliding rotary fit so that said one plate moves with said sleeve-like member and the rotary slitter carried thereby,
k. guide means directing a sheet of material in a rectilinear direction parallel to said depending edges and said flat surfaces of said rotary slitters so that said sheet is fed and slit concomitantly by said rotary slitters,
l. a stripper member mounted adjacent said rotary slitters at an elevation to direct said sheet of material therebeneath and away from said rotary slitters so that said sheet of material is separated continuously from said rotary slitters.

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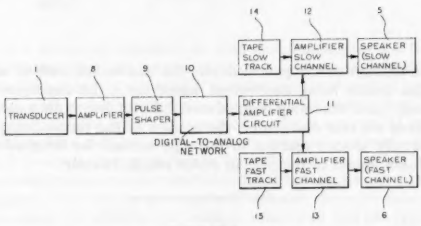
**3,865,001**

## TEMPO ENHANCEMENT DEVICE

**Robert L. Hershey, 1255 New Hampshire Ave., N.W., Washington, D.C. 20036**

**Continuation-in-part of Ser. No. 174,464, Aug. 24, 1971, abandoned. This application May 10, 1973, Ser. No. 358,956**
**Int. Cl. G10h** *3/00*
**U.S. Cl. 84—1.03** **1 Claim**




1. In a device for changing the relative volumes of at least two sources of differently paced musical selections in response to the tempo of movement of a supporting structure caused by shifts of human body weight;
a. an electromechanical transducer for sensing said structural movement and producing a variable voltage in response thereto whose peaks correspond to the excursions of the structure in response to said shifts in human body weight;
b. an amplifier for amplifying said voltage;
c. a pulse shaper to form pulses from said amplified voltage;
d. a digital-to-analog network to produce from said pulses an analog voltage proportional to their period of repetition;
e. a differential amplifier circuit to produce plural output voltages from said analog voltage proportional to the period of repetition;
f. a multichannel amplifier, a stage of amplification in each of whose channels is biased by one of said output voltages, thus producing differing levels of amplification;
g. at least two musical tracks having differing rhythm speeds, prerecorded on different channels of a recording medium, which are amplified to differing degrees by said multichannel amplifier; and
h. at least two speakers to produce sound from said prerecorded musical tracks.

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**3,865,002**

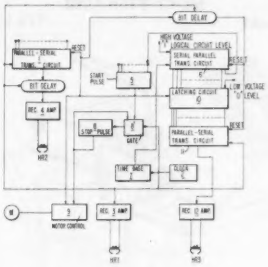
## AUTOMATIC PERFORMANCE SYSTEM FOR ELECTRONIC INSTRUMENTS

**Takehiro Shimizu, and Tutomu Fukui, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Dec. 28, 1973, Ser. No. 429,419**
**Claims priority, application Japan, Dec. 29, 1972, 47-2646**
**Int. Cl. G10f** *5/00;* **G10g** *3/04*
**U.S. Cl. 84—115** **2 Claims**

1. An automatic performance system for electronic instruments comprising a source of clock pulses; parallel-serial

translating circuit means for translating groups of parallel ON-OFF signals generated in parallel in accordance with keying patterns of an electronic instrument, into a train of serial pulse signals that may vary in every predetermined infinitesimal time unit corresponding to a clock pulse; a recording means including a recording head and a recording medium for intermittently driving said recording medium a predetermined distance relative to said recording head in response to a change in said keying pattern so that an output signal from the parallel serial translating circuit means is recorded in one block corresponding to said predetermined distance of a track of the recording medium and so that the



time duration of the block is recorded as time count signals in the succeeding block of another track of the recording medium; means for controlling the intermittent movement of the recording medium in accordance with the time count signal; a reproducing head for reproducing the intermittently recorded output from said parallel-serial translating circuit means; a serial-parallel translating circuit means for translating the recorded train of serial pulse signals, read out through said reproducing head, into groups of parallel signals that vary in said infinitesimal time unit; and means for controlling the performance of the electronic instrument with the output from said serial-parallel translating circuit.

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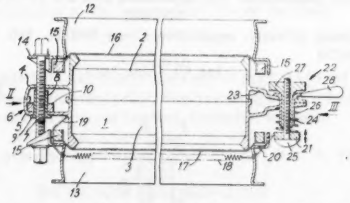
**3,865,003**
**SNARE DRUM**

**Clifford Anthony Della-Porta, Rothley, Leicestershire, England, assignor to The Premier Drum Co. Ltd., Leicester, England**

**Filed Nov. 13, 1973, Ser. No. 415,296**
**Claims priority, application Great Britain, Dec. 10, 1972, 55666**
**Int. Cl. G10d** *13/02*
**U.S. Cl. 84—411** **4 Claims**



**1.** In a drum comprising a cylindrical body shell, batter heads disposed over the ends of this shell, flesh hoops, at the ends of the shell engaging the margins of said heads, counter hoops disposed around said flesh hoops, snares anchored at one end to the shell and disposed over one of the heads, and a snare strainer unit mounted at the opposite side of the shell and connected to the other end of the snares, the improvement in which the body shell is composed of two abutting cylindrical half-shells each with a number of hollow half-lugs spaced around the periphery of the body and complementing and abutting the hollow half-lugs of the other half-shell and forming, in the assembled condition of the drum shell, a plurality of hollow lugs around the periphery of the shell, each of these half-shells, with its half-lugs, being made as an integral unit moulded in one piece, each hollow half-lug having a threaded female member located therein and circumferentially offset from the threaded female member of the complementary hollow half-lug of the other half-shell, a plurality of bolts arranged annularly around the exterior of the body shell and connecting the counter-hoop of one half-shell to the hollow half-lugs of the other half shell, each bolt passing through its associated counterhoop and into threaded engagement with the threaded female member in its associated half-lug of the other half-shell.

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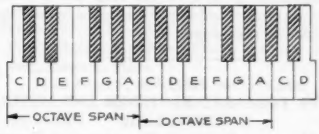
**3,865,004**
**KEYBOARD TYPE MUSICAL INSTRUMENT**

**Donald K. Coles, 2505 Capitol Ave., Fort Wayne, Ind. 46806**

**Filed July 10, 1974, Ser. No. 486,973**
**Int. Cl. G10c** *3/12*
**U.S. Cl. 84—423** **6 Claims**




**1.** A musical instrument having a plurality of tone generators which produce a sequence of pitches proceeding from low to high in an approximately equitempered scale, with 12 semitones per octave,

a keyboard having six lower digitals per octave span, not more than one upper digital disposed between two adjacent ones of said lower digitals,

said lower digitals being consecutively numbered from left to right, starting with lower digital number one to the left of said keyboard, said lower digital number one controlling a predetermined lowest pitch generated by one of said tone generators, each of said lower digitals with a number N greater than six controlling a pitch one octave higher than the pitch controlled by that lower digital which has a number equal to N-6, wherein the improvement comprises:

any six consecutive ones of said lower digitals play a six tone scale which is derived from the diatonic scale by the omission of one of its seven tones.

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**3,865,005**
**WIND MUSICAL INSTRUMENT**

**Robert Victor Carree, Mantes-la-Ville, France, assignor to Buffet Crampon, Paris, France**

**Filed Aug. 22, 1973, Ser. No. 390,351**
**Claims priority, application France, Sept. 15, 1972, 72.32707**
**Int. Cl. G10d** *7/08*
**U.S. Cl. 84—380** **8 Claims**

**1.** On a woodwind musical instrument, a supporting structure for two keys positioned to be played by the same finger, comprising:

an instrument body;

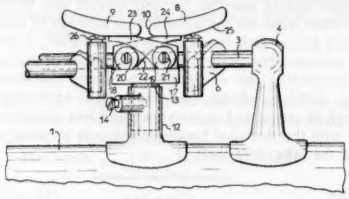
means mounted on said body for supporting first and second shafts, said shafts being mounted parallel to each other with the plane defined by said shafts being parallel to the axis of said body;

a first key connected to said first shaft by an arm, said first key being located above said second shaft;

a second key connected to said second shaft by a second arm, said second key being located above said first shaft;

each of said keys having an edge facing the other key with both of said edges being positioned adjacent to one another and being located the same distance from said body;

first and second stops;



first and second levers mounted on said body for rotation about third and fourth shafts, said first lever having one end connected to said first stop and a second end underlying said first key and adapted to be actuated by depression of said first key; and said second lever having one end connected to said second stop and a second end underlying said second key and adapted to be actuated by depression of said second key.

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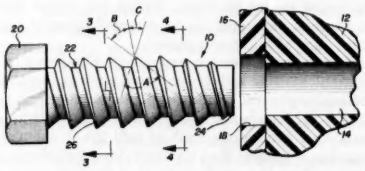
**3,865,006**

## PUSH TYPE THREADED FASTENER AND METHOD OF USING SAME

**Dwight F. Massoney, Rockford, Ill., assignor to Textron Inc., Rockford, Ill.**

**Filed Feb. 14, 1973, Ser. No. 332,280**
**Int. Cl. F16b *25/00***
**U.S. Cl. 85—44** **2 Claims**



1. A push-type threaded fastener designed to be driven into an opening formed in pliable resilient material without rotation thereof, and when seated, rotated to provide a locking action which resists inadvertent rotation thereof, said fastener comprising in combination; a head portion to abut the material around the opening receiving the fastener, a threaded shank having a leading guide portion adjacent the work-entering end of said fastener and a trailing locking portion intermediate said guide portion and said head portion, said leading guide portion including a plurality of thread turns of a generally circular configuration with a crest diameter of said thread turns increasing in a direction away from said work-entering end; said trailing portion including a plurality of thread turns of a non-circular, multilobular configuration, said non-circular threads having a maximum crest height at the lobe portions thereof which is greater than the maximum crest height of said circular thread turns on said leading guide portions, both said circular and non-circular threads having a sloped front flank surface facing toward the leading end of said threaded shank to allow the pliable, resilient material easily to slide thereof as the fastener is driven into the opening formed in said material, and a sloped rear-flanked surface facing toward head portion, said front flank defining a flank angle from about 40° to 60°, with said rear flank defining a flank angle from about 20° to 0°, such that the included angle is approximately 60°, with said flank surfaces merging smoothly to define a crest apex over which said resilient material will flow and conform to the shape of said crest apex to be disposed on opposite sides thereof thereby providing means which resists pullout, wherein said fastener may be rotated a fractional part of a revolution to cause said lobular portion on the trailing non-circular thread to bite into the resilient material and afford a locking action which resists inadvertent rotation.

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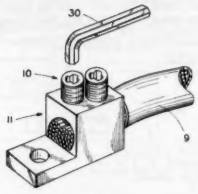
**3,865,007**

## TORQUE DETERMINING ALLEN SCREW

**Harris I. Stanback, Lexington, Ky., assignor to Square D Company, Park Ridge, Ill.**

**Filed July 30, 1973, Ser. No. 384,165**
**Int. Cl. F16b *31/02***
**U.S. Cl. 85—61** **9 Claims**



1. A torque-determining socket head screw comprising an exteriorly threaded cylindrical body having a tool-receiving recess extending axially thereinto from one end face of the body, the recess having an outer basically cylindrical recess portion defining a cylindrical wall open to an adjacent coaxial inner recess portion having a plurality of angularly disposed flat sides, the inner recess portion having a transverse dimension smaller than the diameter of the outer recess and being designed to receive a standard size tool having angularly disposed sides so as to be complementary to the inner recess, and at least one frangible nub projecting radially inwardly from the cylindrical wall of the outer recess, the nub being engageable by the tool and shearable upon the application of a predetermined torque thereto by the tool thereby providing an indication that the screw when received in a threaded opening has been tightened to a predetermined torque value.

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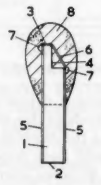
**3,865,008**

## MANUFACTURE OF FUSE HEADS

**Arwyn Theophilus Thomas, 66 Gillmans Rd., Kent, and Raymond James Williams, 48 Langdale Gardens, Sussex, both of England**

**Division of Ser. No. 161,259, July 9, 1971, Pat. No. 3,763,783, which is a continuation-in-part of Ser. No. 110,730, Jan. 28, 1971, abandoned. This application Jan. 26, 1973, Ser. No. 326,842**
**Claims priority, application Great Britain, Feb. 4, 1970, 5356/70**
**Int. Cl. C06c *1/00***
**U.S. Cl. 86—1 R** **12 Claims**



1. A process for the manufacture of fuse-heads comprising forming a suspension of a primary explosive composition in

water containing a small amount of at least one organic hydrophilic polymer in a proportion about 1 to about 10 per cent by weight of the dry primary explosive composition, immersing a bridge wire in said suspension, removing the said bridge wire having a bead of said suspension adhering thereto, and allowing the fuseheads so produced to dry.

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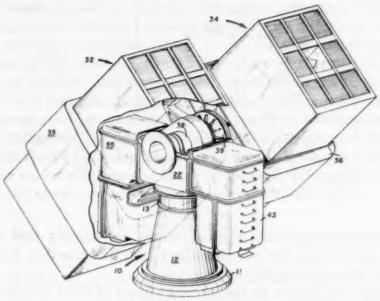
**3,865,009**

## LAUNCHER MOUNT

**Sverre Kongelbeck, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 13, 1973, Ser. No. 396,908**
**Int. Cl. F41f *3/04***
**U.S. Cl. 89—1.815** **6 Claims**



**1.** Apparatus for launching projectiles, comprising:
a stationary central housing;
support means movably surmounting the central housing;
a shaft mounted on the support means, the longitudinal axis of the shaft being perpendicular to the longitudinal axis of the central housing;
mounting means disposed one each on each end of the shaft;
projectile holding means held by each of the mounting means;
first and second auxiliary housings fixed to the support means, one each on opposite sides thereof and disposed externally of the support means, a line joining the housings being perpendicular to the longitudinal axis of the shaft;
azimuth control means in the first housing for rotating the support means in a plane perpendicular to the longitudinal axis of the central housing; and,
elevation control means in the second housing for rotating the shaft to move the projectile holding means in a plane perpendicular to the longitudinal axis of the shaft.

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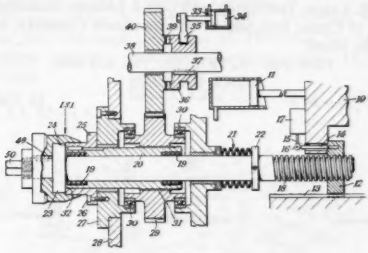
**3,865,010**

## MACHINE TOOL FEED AND STOP MECHANISM

**Brian Hodgson, Rowlands Gill, England, assignor to Machine Tool Divisional Services Limited, Coventry, England**

**Filed Dec. 3, 1973, Ser. No. 421,234**
**Claims priority, application Great Britain, Dec. 4, 1972, 55805/72**
**Int. Cl. B23f *5/22*; B23b *21/00***
**U.S. Cl. 90—4** **5 Claims**

**1.** In a machine tool, the combination of a slide, means for advancing the slide, a screw which is movable both axially and rotationally, a non-rotatable nut which is carried by the screw and acts as a dead stop to arrest advance of the slide, means urging the screw yieldably in the direction of advance of the slide into engagement with a first abutment, means for advancing said first abutment after contact of the slide with the nut to permit further advance of the slide, accompanied by advance of the nut and screw, at a speed governed by the speed of advance of said first abutment, and a second and



fixed abutment which coacts with the screw to prevent further advance of the screw and nut and therefore of the slide.

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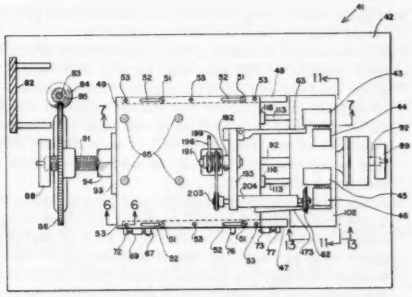
**3,865,011**

## AUTOMATIC KEY DUPLICATING APPARATUS

**George P. Patriquin, Gardner, Mass., assignor to Hudson Lock, Inc., Hudson, Mass.**

**Filed Sept. 5, 1973, Ser. No. 394,500**
**Int. Cl. B23c *1/16***
**U.S. Cl. 90—13.05** **57 Claims**

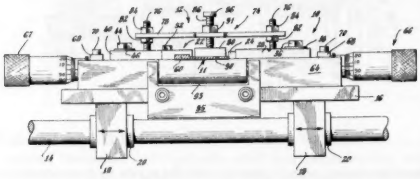


**33.** In a key duplicating machine comprising:
sample vise means for receiving and retaining a sample key to be duplicated;
blank vise means for receiving and retaining a blank key;
clamp means for automatically closing and opening said sample vise means and said blank vise means upon the initiation and termination, respectively, of a cutting cycle;
positioning means for positioning the sample key when said sample vise means is open and for positioning the blank key when said blank vise means is open, said positioning means comprising a plurality of sample positioning fingers independently slidably mounted and projecting toward said sample vise means and engageable with the bitted pattern of said sample key and a plurality of blank positioning fingers independently slidably mounted and projecting toward said blank vise means and engageable with the edge of said blank key, said positioning means being automatically slidably removable from an active position where said positioning fingers engage said sample and blank keys to a passive position where said positioning fingers have been displaced from engagement with said keys when said vise means close.

## 3,865,012
## SKIVING APPARATUS WITH LATERALLY FLOATING SUPPORT PLATFORM FOR PRODUCING MULTI-GAUGE METAL STRIP OF UNIFORM WIDTH

**Roger E. Laigle, Torrington, and Luis J. Lozano, Southington, both of Conn., assignors to The Anaconda Company, Anaconda, Mont.**

**Filed Feb. 16, 1973, Ser. No. 333,046**
**Int. Cl. B23d *1/26***
**U.S. Cl. 90—24 F** **10 Claims**



1. Skiving apparatus for skiving to uniform width the thin edge portion of a multi-gauge metal strip having a thick portion significantly thicker than the thin edge portion such that the thick portion defines a pair of shoulder surfaces on the strip facing in opposite directions, said skiving apparatus comprising:

a base;

a skiving tool mounted on the base for skiving the thin edge portion of the multi-gauge strip,

guide means mounted on the base including a lower guide positioned beneath the thick portion of the strip,

said guide means being located on said base with a predetermined spacing from said skiving tool,

said guide means including a retainer positioned above said thick portion of the strip and located over said lower guide, said retainer having a channel recess dimensioned to slidably engage upon the pair of opposite shoulder surfaces of said thick portion of the strip with a running clearance of the order of 0.0005 of an inch, said skiving tool being mounted laterally to one side of both said shoulder surfaces and

laterally floating support means for said base including fixed transverse guideway means enabling said base to move laterally relative to the direction of feed of said multi-gauge strip to track any lateral undulations of the strip without affecting the predetermined width of the skived thin portion of the metal strip as determined by the predetermined spacing between said guide means and said skiving tool,

whereby the tolerance of the width of the skived thin edge portion of the strip is regularly accurate to within plus or minus 0.0005 of an inch.

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## 3,865,013
## AUXILIARY TOOL CONTROL CIRCUIT

**Joseph A. Mastaj, Holyoke, Mass., assignor to Worthington-CEI, Incorporated, Holyoke, Mass.**

**Filed Nov. 12, 1973, Ser. No. 414,817**
**Int. Cl. F15b *11/16***
**U.S. Cl. 91—411 R** **14 Claims**

1. A control circuit for an auxiliary tool adapted to be operatively associated with control means for another tool having a source of operating fluid and means for delivering the operating fluid under pressure, the control circuit including:

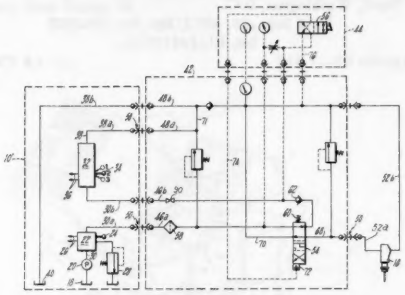
a first fluid conduit means for connecting fluid delivery means to the control means for the other tool, the pressure level in said first fluid conduit means being influenced by the operative state of the control means for the other tool;

pilot operated valve means in said first fluid conduit means;

second fluid conduit means from said pilot operated valve means to the inlet of an auxiliary tool to be powered;

third fluid conduit means for returning fluid from the discharge from an auxiliary tool to be powered to a reservoir;

said pilot operated valve means having a first position interconnecting the parts of said first fluid conduit means upstream and downstream of said pilot operated valve means and connecting said second fluid conduit means to said third fluid conduit means, and said pilot operated valve means having a second position connecting said first fluid conduit means to said second fluid conduit means to deliver operating fluid to the auxiliary tool;



selectively operable control means for arming said pilot valve means for switching from the first position thereof to the second position; and

means responsive to the pressure level of fluid in said first fluid conduit means downstream of said pilot valve means for delivering an operating signal to said pilot valve means and switching said pilot valve means between said first and second positions thereof in the armed state of said pilot valve means.

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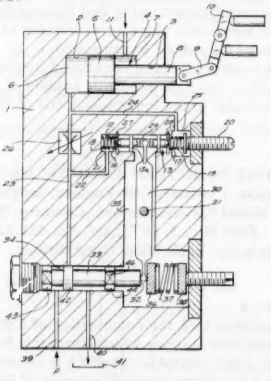
## 3,865,014
## PRESSURE REGULATOR

**Hans-Jurgen van der Kolk, Sersheim, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Continuation-in-part of Ser. No. 153,219, June 15, 1971, abandoned. This application Nov. 2, 1973, Ser. No. 412,439**
**Claims priority, application Germany, June 27, 1970, 2031850**
**Int. Cl. F15b *13/04*, *15/17***
**U.S. Cl. 91—417** **9 Claims**



1. A hydraulic pressure regulator for an adjustable hydraulic machine comprising, in combination, a cylinder, a differential piston axially movable in said cylinder and defining in the latter a pair of pressure chambers to opposite sides of said

differential piston; a control element for the hydraulic machine; means connecting said control element with said differential piston for controlling the position of said control element depending on the position of said piston in said cylinder; means for constantly applying hydraulic fluid at a control pressure to one of said pressure chambers; a control passage connected to the other pressure chamber; a pilot piston valve having a neutral position for controlling, when moved from said neutral position, the supply of hydraulic fluid to said control passage and the discharge of hydraulic fluid from said control passage, in dependence on the direction of movement of said pilot piston valve from said neutral position so as to feed hydraulic fluid into said other pressure chamber or to discharge hydraulic fluid therefrom; passage means for directing fluid at said control pressure against said pilot piston valve for urging the latter in one direction; resilient control force means for urging said pilot piston valve in the other direction; a pressure regulating valve in said control passage; a compensating piston; means for causing any pressure difference across said pressure regulating valve to act on said compensating piston to move the latter in one direction or the other from a neutral position; and mechanical follow-up means in engagement with said pilot piston valve and said compensating piston for moving said pilot piston valve in response to movement of said compensating piston so as to assist the force of the hydraulic fluid or of said control force means acting on said pilot piston valve to return the latter to said neutral position, so as to avoid over-travel of said differential piston.

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**3,865,015**

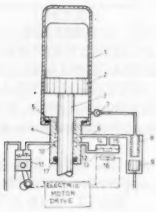
## SEALING MEANS FOR THE PISTON ROD OF A STIRLING ENGINE

**Sven Hakansson, Malmo, Sweden, assignor to Kommanditbolaget United Stirling (Sweden) AB & Co., Malmo, Sweden**

**Continuation of Ser. No. 252,558, May 12, 1972, abandoned. This application Oct. 2, 1973, Ser. No. 402,906**

**Int. Cl. F15b** *21/04;* **F15j** *15/18;* **F01b** *31/10*

**U.S. Cl. 92—78** **6 Claims**



1. A sealing device for a piston rod extending from a cylinder allowing restricted passage of leakage gas from the cylinder alongside said rod comprising in combination, an end wall member for said cylinder through which said piston rod extends, a space about said rod in said wall member receiving said leakage gas from said cylinder, a return conduit from said space to said cylinder, and a non-return valve in said conduit which allows gas to flow through said return conduit only in the direction towards said cylinder and including a further space comprising an annular channel in said wall member surrounding said rod at a position along the axis of said rod further away from said cylinder than the first said space, and means filling said further space with oil at a pressure greater than that in said first space to cause oil to flow toward said first space.

**3,865,016**

## METHOD OF PRODUCING FILTER ROD SECTIONS OR THE LIKE

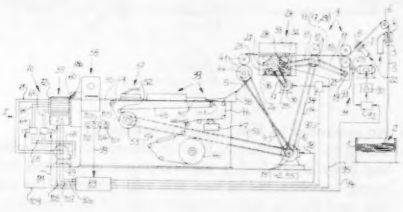
**Heinz Greve, Hamburg, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany**

**Division of Ser. No. 131,167, April 5, 1971, Pat. No. 3,741,846. This application May 15, 1973, Ser. No. 360,598**

**Claims priority, application Germany, Apr. 11, 1970, 2017360**

**Int. Cl. A24c** *5/50*

**U.S. Cl. 93—1 C** **11 Claims**



1. A method of making filter elements or analogous rod-shaped articles which are composed of at least one main component and at least one secondary component, particularly a secondary component which influences the condition of the main component, comprising the steps of converting effective quantities of main and secondary components into a rod; subdividing the rod into a succession of rod-shaped articles wherein the quantity of the main component is measurable independently of the quantity of the secondary component and vice versa; conveying the rod-shaped articles along a predetermined path; carrying out repeated measurements of the quantity of at least one component in selected rod-shaped articles; and regulating the quantity of at least one component in said converting step in accordance with the results of said measurements.

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**3,865,017**

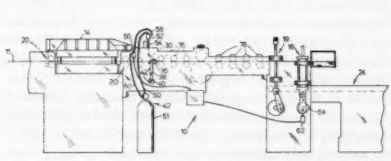
## MACHINE FOR MAKING FILE FOLDERS

**William J. Borski, Brookfield, Wis., assignor to Faustel Inc., Butler, Wis.**

**Filed Jan. 2, 1974, Ser. No. 430,235**

**Int. Cl. B31b** *1/62, 41/60*

**U.S. Cl. 93—1 E** **9 Claims**



1. A machine for forming file folders having reinforced tabs, said machine comprising:

means for conveying blanks in succession along a longitudinal path,

a die positioned to cut and score said blanks,

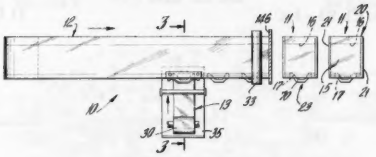
folding means in the path of travel of each of said blanks for folding the lead edge against the blank to form a double ply, said folding means including means for applying glue to the folded edge of said blank as said edge of said blank is being folded,

means for pressing said folded edge of said blank against the blank to form a double ply on the lead edge of said blank, and means for cutting the double ply to form a tab.

## 3,865,018
## APPARATUS FOR MAKING PLASTIC BAGS WITH HANDLES

William Gaffney, Bronx, N.Y., assignor to Charlotte Mintz, New York, N.Y.

Filed Nov. 20, 1972, Ser. No. 308,293
Int. Cl. B31b *1/86*
U.S. Cl. 93—8 WA 3 Claims



1. An apparatus to make bags comprising:

a. means to intermittently feed an elongated thermoplastic bag body sheet having superimposed upper and lower layers unconnected at one side and joined at the other side, and having superimposed edges at said one side;

b. means to intermittently feed elongated superimposed upper and lower imperforate thermoplastic handle sheets of uniform width between the upper and lower layers at said one side;

c. means to intermittently fuse leading ends of said upper and lower handle sheets to said upper and lower layers of said bag body sheet, respectively, while said bag body sheet and handle sheets are not being fed, said bag body sheet and said handle sheets being fed in the directions of their lengths, said directions of lengths being perpendicular to one another; and

d. means to intermittently cut entirely across said handle sheets on identical parallel lines having aligned, spaced outer portions adjacent said superimposed edges of said superimposed layers of said bag body sheet, converging portions extending from the inner ends of said outer portions outwardly beyond said superimposed edges and a central portion interconnecting said outer ends of said converging portions and in spaced relation to said superimposed edges of said bag body sheet to provide by successive spaced cuts handles for said bag and for each handle a hand hole defined by said central portion, said converging portions and said edge of said bag body sheet intermediate the converging portions, said handle having parallel inner and outer edges across the full length of said handle and having a similar width throughout when measured in a direction from said joined side of said bag body sheet to said unconnected side so that said handles are formed without waste, said means for intermittently feeding said bag body sheet and handle sheets including means to feed said bag body sheet and handle sheets only while said means to intermittently fuse said handle sheets to said bag body sheet is not being actuated and while said means to intermittently cut said handle sheets is not being actuated, said means for intermittently feeding said handle sheets advancing said handle sheets a distance equal to the width of said handles.

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## 3,865,019
## METHOD OF MAKING BAGS WITH FILM LINERS

Robert W. Bolling, Savannah, Ga., and Jerry H. Reeves, Bluffton, S.C., assignors to Union Camp Corporation, Wayne, N.J.

Division of Ser. No. 269,755, July 7, 1972. This application June 28, 1974, Ser. No. 484,109
Int. Cl. B31b *39/26*
U.S. Cl. 93—35 R 7 Claims

1. The method of making a paper bag with a film liner comprising the steps of

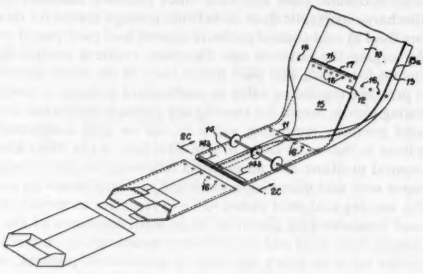
providing a flat film tube having sealed bands at spaced intervals which bands will serve as the bottom seals of the liners of the finished bags;

feeding said tube onto a paper web;

passing the combined web and film tube over a tube former which forms the paper web into a tube around the former and the film tube;

securing the outer edges of the paper tube together;

securing the film tube to the paper tube by spaced lines of adhesive each of which is ahead of, spaced from, and parallel to each sealed band of the film tube;



cutting the paper-film tubes transversely along a line parallel to and between the said line of adhesive and the adjacent sealed band into bag lengths, the ends of the tubes ahead of the cut to form the top of the finished bag and the ends of the tubes in back of the cut to form the bottom of the bag;

opening the bottom end of the paper tube length preparatory to forming a bottom closure for the paper tube;

moving the film tube out of the way of the bottom end of the paper tube to permit formation of the bottom closure without inclusion of the film tube in such closure;

forming the bottom closure of the paper tube whereby the film tube will be completely free and unattached in the bottom area of the finished bag.

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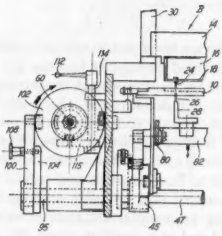
## 3,865,020
## DEVICE TO SELECTIVELY CONTROL THE EXPELLERS OF AUTOMATIC MACHINES TO PUNCH CARDBOARD SHEETS OR THE LIKE

Giancarlo Erba, and Busto Arsizio, both of Varese, Italy, assignors to Officina Meccanica Erba & C. Soc. Acc. Semplice, Varese, Italy

Filed May 18, 1973, Ser. No. 361,464
Claims priority, application Italy, May 25, 1972, 24864/72
Int. Cl. B31b *1/74*
U.S. Cl. 93—36 A 10 Claims



1. An apparatus for ejecting cut-out portions of a sheet, comprising:

ejector frame means having a plurality of first ejecting elements projecting therefrom;

table means disposed opposite said frame means and coacting therewith for permitting said ejecting members to remove the cut-out portions from said sheet, said table means including a first support device and a table fixed to said support device, said table being adaptable to have said sheet deposited thereon and also having a plurality of openings therein which cooperate with the first ejecting elements for permitting removal of said cut-out portions; a second support device movably mounted relative to said first support device and a plurality of second ejecting elements mounted on said second support device and disposed on the side of said table opposite said frame means, said second ejecting element being disposed directly opposite at least some of the first ejecting elements whereby the sheet when supported on said table is positionable therebetween;

drive means for causing relative movement of said table means toward and away from said frame means so that said first ejecting elements remove said cut-out portions when said frame means and table means are moved relatively toward one another, said drive means including aligned driving and driven members and first linkage means drivingly connected between said driven member and one of said first support device and said frame means; said drive means further including first disengageable clutch means coacting between said driving and driven members for permitting said driven member to be drivingly coupled to said driving member only when said members are in a selected angular relationship with one another, thereby insuring the necessary synchronism of the various parts of the apparatus; and

said drive means still further including second linkage means drivingly connected between said driven member and said second support device for causing movement of said second ejecting elements toward and away from said first ejecting elements, said second linkage means including second disengageable clutch means for permitting deactivation of the second support device and the second ejecting elements independently of said first ejecting elements.

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**3,865,021**

## AIR INJECTING APPARATUS FOR AIR CONDITIONERS OR THE LIKE

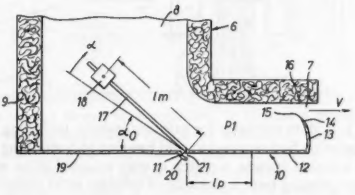
**Guido Amandus De Lepeleire, Heverlee, Belgium, assignor to Danfoss A/S, Nordborg, Denmark**

**Filed May 2, 1973, Ser. No. 356,478**

**Claims priority, application Germany, May 5, 1972, 2222060**

**Int. Cl. F24f** *13/10*

**U.S. Cl. 98—40 C** **8 Claims**




1. An air conditioning system air inlet assembly comprising an air flow duct, a damper forming a variable outlet orifice for said duct, said damper being mounted for pivotal movement relative to a horizontally extending axis, said damper being movable in an opening direction by pressurized upstream air in said duct, mechanical means biasing said damper in a closing direction, said mechanical means having an angular relationship with said damper to vary the size of said orifice in accordance with the pressure of said pressurized air to maintain a constant air velocity at said orifice, said duct extending horizontally, and said damper having a flat portion below and in generally parallel relation to a portion of said duct.

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**3,865,022**

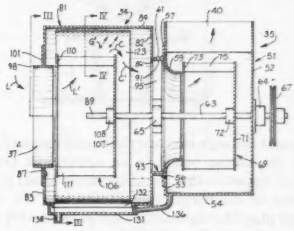
## EXHAUST FUME TREATMENT APPARATUS

**Willard K. Ahlrich, 15960 N. Lake Shipp Dr., Winterhaven, Fla.**

**Filed Mar. 7, 1973, Ser. No. 338,871**

**Int. Cl. F23j** *11/02*

**U.S. Cl. 98—115 K** **15 Claims**




1. Exhaust fume treatment apparatus for removing contaminant materials from a gas, comprising in combination:

a substantially cylindrical extractor housing having a peripheral wall and an inlet and an outlet in opposite end walls thereof;

suction blower means coupled to the outlet of said housing for drawing gas therethrough and having a rotatably driven shaft extending into said housing;

a slinger wheel on and rotatable by said shaft and located in said housing, said slinger wheel having an open face adjacent said inlet and having a plurality of circumferentially spaced gas contacting blades each angled so that the radially outer edge thereof trails the radially inner edge thereof during normal rotation of said shaft, the opposed downstream ends of said slinger wheel and housing being spaced by an open air passage unoccupied except by said shaft; and

a shield spaced closely radially inboard of the said peripheral wall of said housing by a dead air space and being spaced remotely radially outwardly of said slinger wheel by a reduced gas velocity zone, the radial extent of said reduced gas velocity zone being at least several times that of said dead air space, said shield at least partially circumferentially surrounding said slinger wheel, said shield being pierced by a plurality of holes for receiving contaminant masses thrown outwardly by said slinger wheel and admitting same to said dead space between said shield and said housing peripheral wall;

means for increasing axial uniformity of material build up on said blades comprising a radially extending air deflector disk fixed to said shaft axially within said slinger wheel, the periphery of said disk being spaced radially intermediate the shaft and inner slinger blade edges.

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**3,865,023**

## KITCHEN APPLIANCE FOR SKIMMING FAT

**Harold W. Halvorsen, 600 16th St. 106, Silver Spring, Md.**

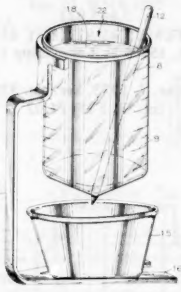
**Filed Apr. 18, 1973, Ser. No. 352,285**

**Int. Cl. A47j** *43/28*

**U.S. Cl. 99—495** **1 Claim**

1. A cooking vessel for separating two ingredients comprising a dispensing vessel having a tapered bottom leading toward a centrally disposed aperture through which the contents may pass by force of gravity, a removable plug-like element

with a tapered end fitting partly into said aperture to seal the vessel bottom against leakage of the contents, the plug-like element having structure so that it may be manually manipulated to release only a distinguishable part of the ingredients



of the vessel through said aperture, and means fixedly mounting said dispensing vessel in an uppermost position over a receptacle vessel so that the dispensing vessel is held still and is adapted to discharge its contents into the second vessel when said plug-like element is manipulated with a single hand.

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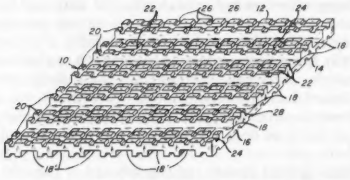
**3,865,024**
**FREEZER SPACER**
**Dennis M. Melnick, and Mark Kubick, both of Baden, Pa., assignors to Pallet Development Inc., Ambridge, Pa.**
**Filed Sept. 19, 1973, Ser. No. 398,650**
**Int. Cl. B65g** *1/14*
**U.S. Cl. 99—645** **7 Claims**



1. A freezer spacer formed of a resinlike material comprising: a first generally horizontally extending wall; a second generally horizontally extending wall vertically spaced from said first wall; a vertical wall extending substantially continuously between said first and second walls adjacent the outermost peripheries thereof; said first and second walls each including a plurality of spaced bearing portions and a plurality of spaced outwardly open continuously extending grooved passageway means intermediate said spaced bearing portions; a plurality of continuously walled vertical openings extending through said first and second walls; and the ratio of the horizontal areas of said grooved passageway means to the horizontal areas of said spaced portions being in the range from 2 to 3 through 3 to 1.

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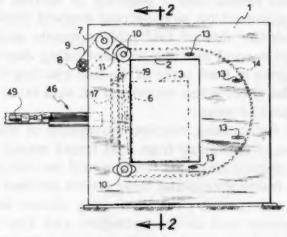
**3,865,025**
**AUTOMATIC BUNDLE STRAPPING MACHINE**
**Pierre Gagnon, 5637 Wilderton St., and Pierre Laforest, 1943 Bruxelles St., both of Montreal, Quebec, Canada**
**Filed June 6, 1973, Ser. No. 367,590**
**Int. Cl. B65b** *13/34*
**U.S. Cl. 100—26** **3 Claims**

1. A bundle tying machine comprising a looping assembly constructed and arranged to form a loop of tying element around a bundle and to form a portion of tying element overlapping the initial end of the latter, an attaching assembly arranged to attach said initial end to said overlapping portion of said tying element, an integrated cutting and clamping assembly consisting of a first and a second jaw pivotally connected one to the other, a cutting edge and a clamping member mounted onto one of said jaws and located side by side transversely of the latter and arranged to perform concerted clamping and cutting of the same tying element, said cutting and clamping assembly displaceably mounted for to and fro movement adjacent of and transversely of said initialed and



overlapped portion of said tying element, a carriage on which said assembly is mounted for bodily movement therewith, an actuator connected to said carriage and arranged to produce said to and fro movement of said assembly, guide track means engaging said carriage and guiding the latter in said to and fro movement, said assembly movable from a clamping position holding fast said initial end to a cutting position for cutting said overlapping portion and holding the following end of the tying element.

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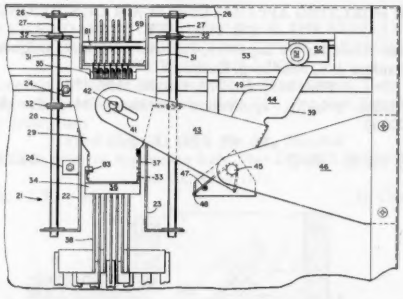
**3,865,026**
**IMPRINTER**
**Mitchel A. Trout, Albany, Calif., assignor to Dymo Industries Inc., San Francisco, Calif.**
**Filed July 23, 1973, Ser. No. 382,080**
**Int. Cl. B41l** *47/56*
**U.S. Cl. 101—45** **14 Claims**



1. A data recorder for printing indicia, including a housing, a printing bed secured to said housing and retaining a plurality of variable indicia, a platen carrier adapted to be moved over said printing bed, a plurality of selector arms slidably retained by said housing and variably positionable to vary the presentation of said variable indicia wheels, and a reset apparatus for returning said variable indicia wheels and said selector arms to a neutral position, said reset apparatus comprising;

slide means for reciprocally translating along said selector arms,

latch means, pivotally secured to said slide means, for engaging said selector arms and returning said selector arms to said neutral position,

crank means, secured to said slide means and operatively associated with said platen carrier, for translating said slide means, and

tooth means, formed on said selector arms, for engaging said latch means.

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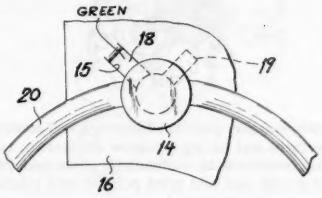
**3,865,027**

## HAND GRENADE WITH SAFETY MECHANISM

**Richard C. Dubno, and Abraham M. Dubno, both of 9 Gaylord Dr., both of Brooklyn, N.Y.**

**Filed Jan. 28, 1974, Ser. No. 437,330**
**Int. Cl. F42b** *27/02*
**U.S. Cl. 102—64** **6 Claims**




**1.** In a hand grenade having a casing receiving an explosive charge and mechanism actuated by a lever pivotally mounted on said casing for detonating said charge, the improvement which comprises in combination a cotter pin releasably receivable in said lever for retaining same against displacement until withdrawal of said pin, a ring swingably received in one end of said pin for withdrawal thereof, and means enabling axial withdrawal of said pin only upon a partial rotation thereof, said means including an outward projection on said pin adjacent said ring and a wall of said lever, said projector being engageable behind said wall.

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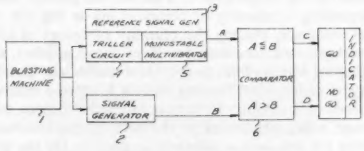
**3,865,028**

## ENERGY TESTER FOR TESTING BLASTING MACHINES THAT DETONATE ELECTRO-EXPLOSIVE DEVICES

**Kaushik H. Thakore, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Dec. 26, 1972, Ser. No. 317,911**
**Int. Cl. 324** *111;* **G01r** *21/00;* **F23g** *7/02*
**U.S. Cl. 102—70.2 R** **16 Claims**




**1.** Apparatus comprising a blasting machine of the type that discharges energy stored in a capacitor to initiate a plurality of electro-explosive devices, means for indicating when said energy discharged from said blasting machine is above a predetermined energy value, said means comprising:

circuit means including a series connected resistor and capacitor for receiving said energy discharged from said blasting machine and for producing a first signal which is related to the amount of energy discharged;

means for generating a reference signal which is related to a predetermined amount of energy;

means for comparing said reference signal to said first signal and generating a third signal when said amount of energy discharged from said blasting machine is not less than said predetermined amount of energy; and

means responsive to said third signal for indicating the presence of said third signal, whereby said indicating means indicates that the energy discharged from said blasting machine is above said predetermined amount.

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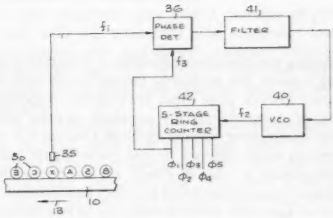
**3,865,029**

## TIMING SIGNAL GENERATING MEANS FOR A HIGH SPEED PRINTER

**Dan R. Lytle, Granada Hills, Calif., assignor to Data Products Corp., Woodland Hills, Calif.**

**Filed Jan. 17, 1974, Ser. No. 434,260**
**Int. Cl. B41j** *7/08*
**U.S. Cl. 101—93.14** **10 Claims**




**1.** For use in a printer of the type having a plurality of printing hammers aligned along a printing line, movable character means for moving characters along said print line, the hammers being equally spaced at a hammer pitch definable as $P_h$, and the characters being substantially equally spaced at a character pitch definable as $P_c$, where $P_c/P_h = X/Y$, $X$ and $Y$ being integers with $X$ being greater than $Y$, whereby as said characters are moved along said print line substantially every $Y$th character is aligned with every $X$th hammer, a system for providing timing signals for said hammers, comprising:

first means including sensing means for sensing the movement of said characters and for providing pulses in response thereto;

a voltage controlled oscillator for providing output signals at a variable output frequency which is a function of the input to said oscillator;

an X-stage ring counter with X output lines coupled to said voltage controlled oscillator and clockable by the output signals thereof;

a phase detector for providing an output as a function of the phase relationships between the pulses from said first means and pulses on a selected output line of said ring counter; and

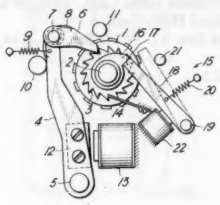
filter-integrating means coupled between said phase detector and said voltage controlled oscillator and having a selected time constant for integrating the output of said phase detector to control said voltage controlled oscillator to provide said output signals at a frequency definable as Z signals per second, where $Z = X \cdot S/P_c$ and S is equal to the speed of said characters in inches per second along said print line and $P_c$ is in inches, as long as the average character pitch of characters sensed by said first means during a period related to said time constant is equal to $P_c$.

**3,865,030**

## PRINTING MECHANISM AUTOMATICALLY POSITIONABLE IN THE SAME START POSITION

**Yoshinori Chida, and Seiki Mizutani, both of Chiba, Japan, assignors to Kabushiki Kaisha Seikosha, Tokyo, Japan**

**Filed Aug. 18, 1972, Ser. No. 281,874**
**Claims priority, application Japan, Aug. 18, 1971, 46-62279**
**Int. Cl. B41j *23/32***
**U.S. Cl. 101—93.22** **9 Claims**



**1.** A printing mechanism comprising: a rotatable print drum containing around the periphery thereof *n* circumferentially spaced-apart rows of print type; drive means responsive to a succession of pulse signals for angularly driving said print drum in an intermittent manner through a succession of angular increments each effected by one pulse signal, said drive means comprising a ratchet wheel, means connecting said ratchet wheel to said print drum to effect intermittent angular movement of said print drum in response to intermittent stepwise rotation of said ratchet wheel, and means including an electromagnet responsive to pulse signals applied thereto to electromagnetically effect intermittent stepwise rotation of said rathcet; positioning means responsive to position control signals and coacting with said drive means to effect positioning of said print drum in the same predetermined angular start position in response to each position control signal thereby ensuring that said print drum commences each rotational cycle of operation from the same start position, said positioning means comprising means for permitting intermittent angular movement of said ratchet wheel until said ratchet wheel positions said print drum in said predetermined angular start position and thereafter preventing further angular movement of said ratchet wheel despite further application of pulse signals to said electromagnet until a predetermined number of pulse signals have been applied to said electromagnet; and a control circuit having means responsive to a first command signal for developing a succession of pulse signals and applying same to said electromagnet while simultaneously developing a position control signal and applying same to said positioning means to effect intermittent angular movement of said print drum until same is positioned in said predetermined angular start position, and having means operable after movement of said print drum to said start position and in response to second command signals for developing, for each second command signal, a succession of n pulse signals and applying same to said electromagnet to effect intermittent angular movement of said print drum from said start position through *n* angular increments back to said start position thereby driving said print drum through one rotational cycle.

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**3,865,031**

## INK SPRAY PRINTER

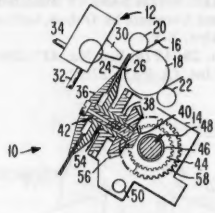
**Ta-Cheng Ku, Endwell, and Sherman H. M. Tsao, Apalachin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 26, 1973, Ser. No. 335,863**
**Int. Cl. B41l *13/00***
**U.S. Cl. 101—114** **1 Claim**

**1.** In character printing apparatus:

a nozzle having fluid ink supplied thereto under pressure to provide a spray of fluid ink directed at a document,

a stencil positioned between the nozzle and the document having a plurality of spaced apart character forming openings therein, said stencil being movably mounted so as to continuously move said openings between said nozzle and a position on said document where a character is to be printed,



a shutter movably positioned between said stencil and said document and having a narrow slit therein, said shutter being positioned to continuously move said slit between said nozzle and said print position and relative to said character openings, and

drive means connected to said stencil and said shutter to move said stencil past said print position in one direction and said shutter past said print position in the opposite direction at different speeds.

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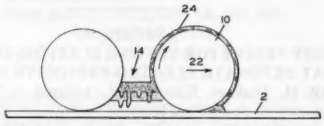
**3,865,032**

## SINGLE PASS MULTI-COLORED SCREEN PRINTING

**Lawrence W. Phelan, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.**

**Filed Aug. 14, 1970, Ser. No. 63,840**
**Int. Cl. B41m *1/12***
**U.S. Cl. 101—129** **1 Claim**



**1.** In a method of printing a multi-colored pattern on a substrate by the single pass of a silk screen printer, the steps of: depositing a plurality of colors of ink in the silk screen printer reservoir, placing the plurality of colors of ink in a distinct layer structure with one layer above another, slightly agitating the layers of ink to provide a marbleized blending of the layers of ink, then moving the ink from said reservoir to the screen of the printer by the use of a roll structure, said roll structure being positioned at the side of the reservoir and applying the ink onto a substrate to provide for the printing thereon of a pattern having a plurality of colors, with only a single pass of the substrate relative to the screen printer.

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**3,865,033**

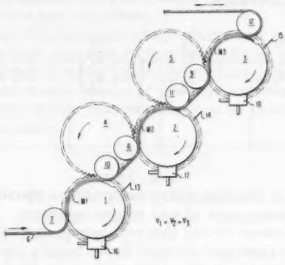
## MULTI-COLOR DYE-TRANSFER APPARATUS

**Seiichi Taguchi; Sigeru Tezuka; Takeshi Tomotsu, and Eiichi Mizuki, all of Asaki, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation-in-part of Ser. No. 159,968, July 6, 1971. This application Oct. 24, 1973, Ser. No. 409,205**
**Claims priority, application Japan, July 6, 1970, 45-58883**
**Int. Cl. B41f *5/18***
**U.S. Cl. 101—181** **2 Claims**

**1.** In an apparatus for transferring multiple color dye images in superimposed fashion, in sequence, on a tensioned moving

web, during which the web becomes water saturated and stretches longitudinally, said apparatus including: a plurality of rotatable drums, each drum supporting a matrix on its periphery, means for driving the drums at the same angular velocity, dye solution supplying devices operatively associated with said drums to supply a different color dye to respective drum matrices, and a plurality of press rollers disposed in contact with the web and pressing the web into peripheral contact with the drums for a prescribed duration, the improvement wherein: the diameters of successive drums increase in the direction of web movement in direct proportion to the longitudinal stretch of the web caused by water saturation during image transfer to compensate for web stretching and prevent slack from occurring within the web from drum to drum, and thereby maintain full web contact with the drums to improve registration of the superimposed color dye images transferred from the various matrices to the web during movement of said web through said apparatus.



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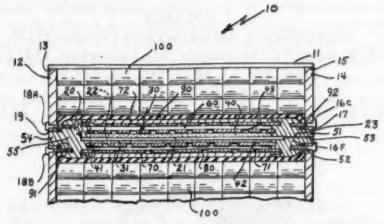
**3,865,034**

## SUBMISSIBLE AIR-TO-SURFACE WARHEAD WITH PROPELLANT-DIAPHRAGM DEPLOYMENT MECHANISM

**Thomas W. Boulter, Maitland, and Bernard Van Zyl, Altamonte Springs, both of Fla., assignors to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Dec. 20, 1971, Ser. No. 210,257**
**Int. Cl. F42b** *25/16*
**U.S. Cl. 102—7.2** **3 Claims**



1. A submissile warhead, adapted for use with a parent air-to-surface missile structure from which said warhead is launched onto a designated ground target, comprising:

a. a housing which includes:

1. a hollow open-ended cylindrical casing of frangible material;
2. a first circular end plate connected to and closing one open end of said casing;
3. a second circular end plate connected to and closing the other open end of said casing;

b. a plurality of submissiles positioned within said housing, with each of said plurality of submissiles containing an explosive charge, and with the said plurality of submissiles circumferentially arranged, within said housing, in multiple radial layers;

c. and, means, disposed within said housing, for ejecting said plurality of submissiles, simultaneously and at different velocities, from within said housing, with said means centrally located within said housing and radially surrounded by said plurality of submissiles, and wherein said means includes:

1. a rubber diaphragm in the unexpanded shape of a hollow close-ended cylinder having an aperture at each end, with said rubber diaphragm disposed within and concentric with said casing of said housing, and with said rubber diaphragm constrained and retained at each end by suitable means which also closes the apertures of said rubber diaphragm;
2. a soft aluminum alloy diaphragm in the unexpanded shape of a corrugated hollow open-ended cylinder, with said soft aluminum alloy diaphragm positioned internal of, concentric with, and abutting said rubber diaphragm, and with said soft aluminum alloy diaphragm disposed between and secured and closed at each end by suitable means;
3. a steel structural tube with a plurality of ports in its wall, with said structural tube positioned internal of, concentric with, and abutting said soft aluminum alloy diaphragm, and with said structural tube disposed between and secured and closed at each end by suitable means;
4. a steel propellant chamber tube with a plurality of ports in its wall, with said propellant chamber tube positioned internal of and concentric with said steel structural tube, and with said propellant fchamber tube disposed between and secured and closed at each end by suitable means;
5. and, a propellant charge explosive train, for generating gas, disposed essentially within said propellant chamber tube, wherein said propellant charge explosive train includes:

aa. an igniter explosive charge;
bb. an initiator explosive charge radially surrounding said igniter explosive charge;
cc. and, a propellant explosive charge radially surrounding said initiator explosive charge;

whereby when said submissiles are ejected from said housing, they form a controlled, large, uniform ground impact distribution pattern on the target.

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**3,865,035**

## MULTI-USE MUNITION

**William O. Munson, and Russell Reed, Jr., both of Brigham City, Utah, assignors to Thiokol Chemical Corporation, Bristol, Pa.**

**Filed Jan. 16, 1969, Ser. No. 793,922**
**Int. Cl. F42b** *13/14, 13/12;* **C06b** *15/00*
**U.S. Cl. 102—66** **18 Claims**

1. A munition which will explode when detonated and which when ignited will eject burning incendiary strands which will burn without exploding, comprising in combination:

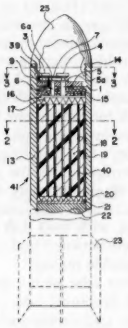
a substantially cylindrical elongated munition casing having accessible opposite ends and having its inner wall extending between said ends;

frangible closure means for said casing disposed in one of said ends;

a munition loading disposed in said casing with one end thereof adjacent to said closure means, said munition loading comprising a multiplicity of ejectable elongated strands of high explosive-incendiary composition disposed within said casing with the long axes of said strands arranged parallel to said casing wall, and substantially filling said casing between said ends, each of said strands comprising an open-ended tube, said tube containing a

cured high explosive-incendiary composition which will burn when ignited and explode when detonated;

gas generating means disposed adjacent to the other said end of said munition loading for ejecting said loading from said casing after ignition of the strands;



closure means for the casing disposed in said casing adjacent to said gas generating means; and

initiator means for igniting and exploding said loading, said initiator means being supported by said latter closure means.

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**3,865,036**

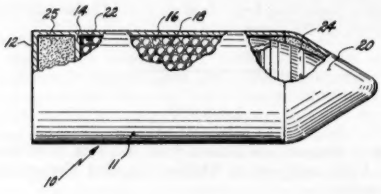
**HIGH LETHALITY SHRAPNEL PROJECTILE**

**Dale M. Davis, Freeport, Fla., assignor to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Dec. 8, 1967, Ser. No. 690,714**

**Int. Cl. F42b** *13/18*

**U.S. Cl. 102—67** **4 Claims**



**1.** In a shrapnel having tubular sides, a solid base, a cavity containing projectiles and an ogival head, the improvement therein comprising a projectile having a first penetrating layer of dense material, a first attenuating layer of material less dense than said first penetrating layer of material having one surface therof fixedly secured by an adhesive to one surface of said first penetrating layer, a second penetrating layer of material at least as dense as said first penetrating layer having one surface thereof fixedly secured by an adhesive to the other surface of said first attenuating layer, a second attenuating layer of material less dense than said first penetrating layer having one surface thereof fixedly secured by an adhesive to the other surface of said second penetrating layer and a third penetrating layer of material at least as dense as said second penetrating layer having one surface thereof fixedly secured by an adhesive to the other surface of said second attenuating layer, whereby the penetrating layers of material pulverize in sequence upon striking a multiple plate target.

**3,865,037**

**PYROTECHNICAL COMPOSITION STATIC RELAYS**

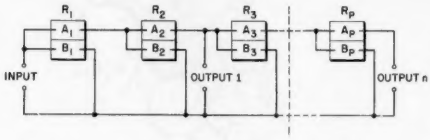
**Jacques Claude Delgendre, Toulon; Alain Roger Kerreneur, Paris, and Georges Albert Berton, Toulon, all of France, assignors to Etat Francaise Delegation Ministerielle pour L'Armement, Paris, France**

**Filed May 26, 1972, Ser. No. 257,197**

**Claims priority, application France, May 26, 1971, 71.18979**

**Int. Cl. H01h** *37/76*

**U.S. Cl. 102—70.2 R** **3 Claims**




**1.** A pulse counting circuit comprising a plurality of static electrical relays, each of said relays comprising

a first element having first and second spaced electrodes therein, said first element being initially insulating and becoming conductive upon exposure to heat;

a second element coupled to said first element, said second element having a pyrotechnical composition;

electrically excited means having third and fourth terminals for initiating the reaction of said second element to produce sufficient heat to cause said first element to become conductive, said first and second spaced electrodes being insulated from each other by said first element prior to initiating the reaction of said second element and being electrically connected after exposure of said first element to the heat generated by said second element;

means for coupling an input pulse across the third and fourth terminals of the electrical exciting means of a first of said plurality of relays and to the first electrode of the first element of said relay,

means coupling the second electrode of the second element of each of said relays to the first electrode and third terminal of a succeeding relay,

means coupling the fourth terminal of each succeeding relay to the fourth terminal of the preceding relay, and

means for obtaining an output voltage between the second electrode and fourth terminal of each of said plurality of relays.

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**3,865,038**

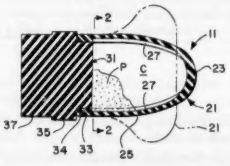
**DETERRENT AMMUNITION PROJECTILE**

**Irwin R. Barr, 110 Martingale Rd., Lutherville, Md. 21093**

**Filed July 13, 1973, Ser. No. 378,855**

**Int. Cl. F42b** *11/18, 31/00*

**U.S. Cl. 102—92.7** **23 Claims**



**1.** Deterrent ammunition, comprising,

a projectile formed by a rupturable flexible side wall section with a cavity formed therein and having an annular bounding wall with annularly spaced plural longitudinally extending thinner weakened rupturable longitudinal wall zones which are substantially weaker than interconnect-

ing relatively thicker structurally reinforcing side wall sections between said thinner weakened zones,
said side wall section being open at its rear end for securement to the forward end of a separate base section,
nose and base sections closing said cavity at its forward and rearward ends,
and a flowable dispersable material charge in said cavity for dispersal upon impact of said projectile with a target,
said base section being a separate body secured at its forward end to the open rear end of said rupturable flexible side wall section along an annular rupturable shouldered connection zone therewith,
said base section being relatively substantially more rigid as a body than said wall section and forming a forwardly moving piston acting against said charge and said side wall section upon impact of said nose with a target mass, to thereby enable rupture along one or more of the respective zones.

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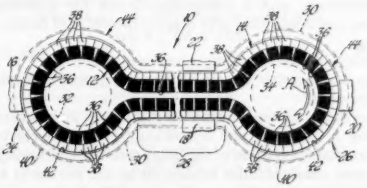
**3,865,039**
**TRANSPORTATION SYSTEM**
**Walton W. Cushman, Fraser, Mich., assignor to Lon H. Romanski, Sterling Heights, Mich.**
**Filed Nov. 9, 1972, Ser. No. 304,903**
**Int. Cl. B61k 1/00**
**U.S. Cl. 104—18** **62 Claims**



1. A transportation system, comprising a first closed loop transporter means effective for continuously moving in a first closed loop path, means defining at least a plurality of stationary station-like areas, second closed loop transfer means located as to be generally between at least certain of said station means and said transporter means, propelling means effective to cause said transporter means to continuously move at a substantially constant speed and to cause said transfer means to move in a second closed loop path, and additional controllable means for causing said transfer means to cyclically maintain a speed substantially equivalent to the speed of said transporter means for a first period of time then to cause said transfer means to controllably decelerate until said transfer means is substantially stationary with respect to at least certain of said station-like areas for a second period of time then to cause said transfer means to accelerate until said transfer means is again at a speed substantially equivalent to the speed of said transporter means.

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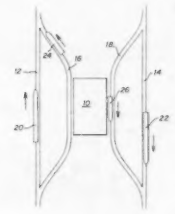
**3,865,040**
**MONORAIL TRANSPORTATION SYSTEM**
**George A. Steen, 702 College St., Cleveland, Miss. 38732**
**Filed May 23, 1973, Ser. No. 363,002**
**Int. Cl. B61k 1/00**
**U.S. Cl. 104—18** **16 Claims**

1. A transportation system comprising:
an elevated rail having an upper track surface and first and second opposed sides,
shuttle tracks branching from said first side of said rail to provide exits from and entries to said rail only from said first side,
a shuttle car having a propulsion system for propelling said car along said upper track surface and having an overhang housing with lower wheels which bear against said first side of said rail, said lower wheels causing said shuttle car to exit and enter said rail from said shuttle tracks,
a main car having a propulsion system for propelling said car along said upper track and having an overhang housing with lower wheels which bear against said second side of said rail, said lower wheels of said main car preventing said main car from entering said shuttle tracks, and



means for connecting said shuttle car and said main car for travel along said rail and for disconnecting said shuttle car from said main car for exit of said shuttle car on said shuttle tracks.

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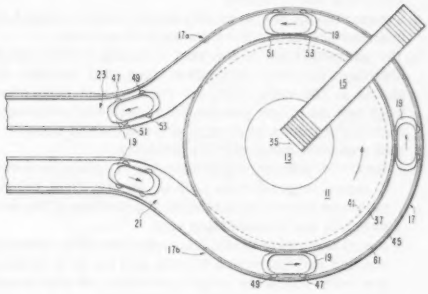
**3,865,041**
**ROTARY PLATFORM VEHICLE PASSENGER LOADING SYSTEM**
**Karl W. Bacon, Mountain View, Calif., assignor to Arrow Development Co., Inc., Mountain View, Calif.**
**Filed Apr. 16, 1973, Ser. No. 351,509**
**Int. Cl. B61k 1/00**
**U.S. Cl. 104—20** **17 Claims**



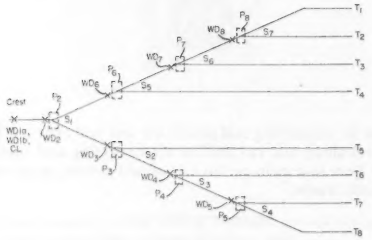
1. A passenger loading station for passenger carrying vehicles, comprising:
an annular passenger platform rotatable about a fixed axis and having a resilient compressible bumper attached thereto around its outside circumferential edge,
a fixed circular vehicle guide segment positioned around the outside of a portion of the platform circumference and guide portions leading toward and away from said circular guide segment, and
means for urging said vehicles against said platform bumper in a manner that the frictional engagement of the vehicle with the bumper prevents relative movement therebetween when a vehicle is in said circular guide segment.

3,865,042

## AUTOMATIC SWITCHING CONTROL SYSTEM FOR RAILWAY CLASSIFICATION YARDS

John J. DePaola, Penfield, and Charles W. Morse, Rochester, both of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Apr. 4, 1973, Ser. No. 348,376
Int. Cl. B61l 7/08
U.S. Cl. 104—26 B 16 Claims




1. Apparatus for controlling the switches in a railway classification yard to route each cut of cars rolling down the crest to its proper destination including car sensing devices at the crest and at each switch, said apparatus comprising;

computer means responsive to said sensing devices and which has stored therein:

a. a sequential list of cars as they appear at the crest and an intended destination track for each of said cars,

b. the characteristics of the yard including a table which identifies, for each destination track, the switches included in the route from the crest to said destination track and the proper position for each of said switches to route a cut from said crest to said destination track,

c. said computer means further providing,

1. means for determining the number of cars in each cut,

2. means responsive, to each cut at said crest, to said table and said list to determine the position of the first switch in said classification yard,

3. means responsive to said last named means to correctly position said first switch to route said cut to its destination track unless the proper positioning of said switch would result in an unsafe condition,

4. means responsive, to the presence of a cut at any subsequent switch, to said table and said list to determine the position of the next succeeding switch in the yard for the cut to reach its required destination track,

5. means responsive to said last named means to correctly position said next succeeding switch unless the correct positioning of said next succeeding switch would result in an unsafe condition,

6. means to compare the position of each switch as each cut is adjacent thereto with the required position for said cut to reach its intended destination track,

7. means responsive to said last named means when indicating a lack of comparison and to said table to select a different destination track for said cut, and

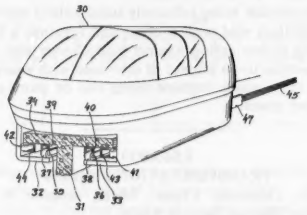
8. means responsive to said last named means to modify said list for said cut by substituting said different destination track for said intended destination track.

3,865,043

## DEVICE FOR DETECTING AND CONTROLLING THE SPACING BETWEEN TWO JUXTAPOSED BODIES

Peter Schwarzler, Furstenfeldbruck, Germany, assignor to Krauss-Maffei Aktiengeselischaft, Munich, Germany

Filed Oct. 4, 1972, Ser. No. 297,035
Claims priority, application Germany, Nov. 25, 1971, 2158387
Int. Cl. B61b 13/08
U.S. Cl. 104—148 MS 8 Claims




1. The combination of a vehicle track, a vehicle displaceable along said track, and magnet means suspending said vehicle and guiding same along said track with a gap spacing therebetween, with a contactless device for detecting the spacing and controlling said magnet means, said device comprising:

a first member extending along said track;

a second member on said vehicle juxtaposed with said first member;

a parallel resonant network on one of said members including a capacitor and a coil confronting an electrically conductive portion of the other member and having magnetic characteristics influenced by the proximity of said conductive portion, said capacitor being connected across said coil;

a constant-frequency oscillator connected in circuit with said resonant network;

output-circuit means connected to said resonant network and responsive to an electrical parameter thereof for producing an output in dependence upon the mutual spacing of said members;

control means for operating said magnet means to maintain said gap spacing substantially constant; and

an ohmic resistance in series with said oscillator and said parallel-resonant network, said output-circuit means including a voltage detector responsive to the voltage across said network, said output-circuit means being connected across said network between said resistance and the network.

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3,865,044

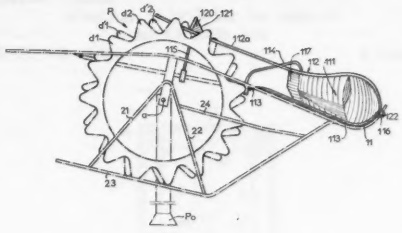
## GUIDE DEVICE FOR THE HAULAGE ATTACHMENTS OF A SKI-LIFT OR SIMILAR DEVICE

Guy Henri Bancel, 83 rue, Petit, 75019 Paris, France

Filed May 31, 1973, Ser. No. 365,737
Claims priority, application France, June 2, 1972, 72.19951; Feb. 15, 1973, 73.05386
Int. Cl. B61b 7/10, 11/00
U.S. Cl. 104—197 10 Claims

1. In an installation for hauling loads, a device for guiding supporting said loads on a cable over a guide pulley over which the cable passes, comprising means disposed along the path of the haulage cable, extending from upstream of the pulley, in the normal displacement direction of the cable, to beyond the rotation axis of said pulley, said means comprising at least two wire shape members which provide at least two support zones within which the haulage attachments are guided by at least one or the other of said wire shape members in order to be brought eventually with the auxiliary members

connected thereto, and depending upon the orientation of the incoming hauling attachment so that said hauling attachment is cammed or guided away from said pulley and then guided



back to its original orientation to a position enabling normal passage over the pulley when the cable to which said attachment is connected advances.

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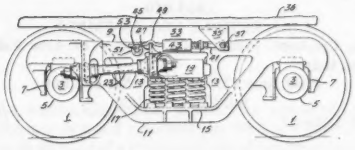
**3,865,045**

## RAILWAY VEHICLE TRUCK WITH DEVICE FOR DAMPING OSCILLATIONS ABOUT SWIVEL AXIS

**William Clifford Jones, Jr., Granite City, Ill., assignor to General Steel Industries, Inc., St. Louis, Mo.**

**Filed Apr. 25, 1974, Ser. No. 464,113**
**Int. Cl. B61f 3/00**
**U.S. Cl. 105—199 C** **10 Claims**



**1.** In a railway vehicle, a swivel truck comprising wheeled axles spring supporting structure carried by said axles, springs supported on said spring supporting structure, spring supported structure carried on said springs, said spring supported structure having an upwardly facing friction central bearing part, vehicle body structure having a downwardly facing swivel central bearing part in mating pivotal load supporting engagement with said spring supported structure part, a snubbing device extending tangentially with respect to the truck swivel axis and having relatively movable ends, one of its ends being attached to said body structure and its other end portion being engaged with said spring supported structure when said body structure is loaded below a predetermined value, and means on said spring supporting structure engageable with said snubbing device for disengaging the latter from said spring supported structure when said load exceeds said predetermined value.

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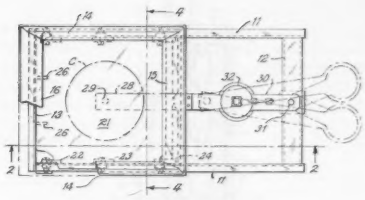
**3,865,046**

## HOPPER DISCHARGE GATE SEALING STRUCTURE

**Oliver C. Fuller, Woodstock, Ill., assignor to Evans Products Company, Plymouth, Mich.**

**Filed Oct. 13, 1972, Ser. No. 297,493**
**Int. Cl. B61d 7/02, 7/20, 7/26**
**U.S. Cl. 105—253** **7 Claims**

**1.** A hopper structure including a support frame, an outlet chute fixedly supported thereon and a gate therefor slidable along said frame, a gate-shifting mechanism comprising a pair of toggle links pivotally interconnected end to end with the outer end of one link pivoted to said frame and the outer end of the other link pivoted to said gate at a point in the central region of the gate and spaced inwardly from all the edges thereof a substantial distance, means for actuating the toggle joint applicable to the interconnection of said links, and a downwardly facing rim on said outlet chute, said gate being spaced vertically below said rim when in open and partly closed positions, upwardly facing elements mounted directly on said frame at points spaced longitudinally thereof and downwardly facing elements mounted directly on said gate at



points similarly spaced longitudinally thereof, said downwardly and upwardly facing elements interengaging to lift the entire gate uniformly throughout its area as it approaches fully closed position for engagement with said rim when it reaches fully closed position, the opposing surfaces of the forward downwardly and upwardly facing elements being higher than those of the corresponding rear elements.

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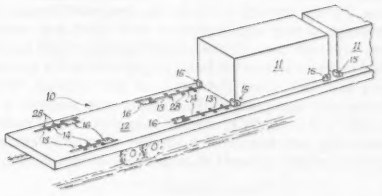
**3,865,047**

## CONTAINER PEDESTAL RETAINING DEVICE

**Emil J. Hlinsky, Oak Brook, and Marvin E. Anderson, Mundelein, both of Ill., assignors to MacLean-Fogg Lock Nut Company, Mundelein, Ill.**

**Filed May 31, 1974, Ser. No. 474,950**
**Int. Cl. B65j 1/22**
**U.S. Cl. 105—366 D** **14 Claims**



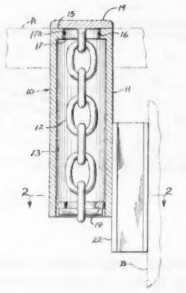
**1.** For use in a collapsible pedestal container support and securement system for container transportation above a vehicle deck, the system including a pedestal guide track comprising a continuation of the deck and having a slot and a pedestal stowage hole therein, and a container support pedestal mounted on, supported by and slidable along the guide track for movement between an upright container supporting position, and a collapsed position through the stowage hole wherein the pedestal is in generally flush relationship with the deck, the pedestal having a reaction member comprising a brace of width for movement through the slot, and a cross member connected to the brace and being wider than the slot; a pedestal retaining device comprising: means defining a closed retaining channel for the brace of the pedestal, and connecting means for securing said channel defining means to the track, said channel being narrower than the cross member in order to retain the brace within said channel.

**3,865,048**

## TRUCK BED TIE-DOWN ANCHORING DEVICE

**Eugene L. Wallace, 3700 Georgetown St., N.E., Canton, Ohio 44721**

**Filed May 1, 1974, Ser. No. 465,796**
**Int. Cl. B61d** *45/00*
**U.S. Cl. 105—484** **7 Claims**



1. An anchoring device for installation in a vehicle or like floor structure for anchoring attachment of a chain or like load-binder device thereto, comprising: a housing adapted for fixed attachment to a said floor structure and having a passage axially therethrough opening at an upper end of the housing; said housing having inwardly and outwardly presented stop seats with respect to said upper end thereof; and an elongated anchor element axially shiftably received in said passage and adapted to be freely passed through said upper end opening of the housing; and longitudinally spaced outer and inner portions of said element, with respect to said passage, having thereon spaced outer and inner stop members movable therewith for selective stop engagement with said outwardly and inwardly presented stop seats of said housing, respectively, in retracted and extended positions of the element with reference to said housing, the effective weight of said elongated element, in an axially vertically disposed condition of said housing, thereby tending to retract the elongated element into said passage to stop engagement of said outer stop member thereon with said inwardly presented stop seat of said housing, and said outer stop member being engageable as for manually drawing said link chain outwardly of said passage, toward anchoring stop engagement of said inner stop member of the same with said inwardly presented stop seat of said housing, for anchoring attachment of a thereby outwardly extended end portion of said element to a said load-binder device.

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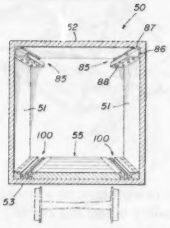
**3,865,049**

## FLOOR LATCH STRIP FOR RAILWAY CARS

**Donald Elmer Hassellof, Munster, Ind., and Cyril George Scherer, Olympic Fields, Ill., assignors to Stanray Corporation, Chicago, Ill.**

**Filed May 11, 1973, Ser. No. 359,718**
**Int. Cl. B61d** *17/00*
**U.S. Cl. 105—376** **6 Claims**

1. A floor latch strip for use in a freight-carrying vehicle equipped with a lading separator carrying downwardly projecting latch elements, said floor latch strip comprising, an elongated body formed of two bars each having an M-shaped transverse cross section, said bars being positioned longitudinally of the vehicle to form with the vehicle upper and lower longitudinally extending channels, with the bottom of said upper channel being defined by spaced apart horizontally extending portions of said bars and said lower channel being defined by spaced apart vertically extending portions of said bars, a keeper fixedly secured to said two bars and extending substantially the entire length thereof, the bottom of said keeper being secured to said lower channel and sealing said lower channel from said upper channel, said keeper having a plurality of locking slots therein for cooperating with the latch elements to latch the lading separators in place, the bottom of



said slots lying in the same plane as the horizontally extending surfaces of said upper channel, whereby said upper channel is readily cleanable due to the alignment of said slots with said upper channel and said lower channel is prevented from being filled with debris due to the sealing thereof by said keeper.

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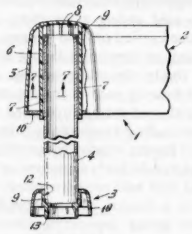
**3,865,050**

## CONVERTIBLE LEG ASSEMBLY

**Claudio Cecchetti, Milan, Italy, assignor to Arco Falc srl, Milan, Italy**

**Filed June 22, 1973, Ser. No. 372,860**
**Int. Cl. A47b** *3/06*
**U.S. Cl. 108—19** **7 Claims**



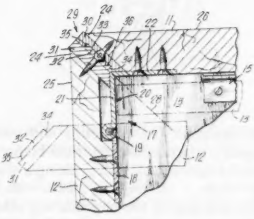
1. A convertible table having a table top adapted to be supported on a floor by means of legs and also adapted to be supported directly on another surface by means of base members in the absence of legs, comprising a table top, a plurality of sockets on the underside of said table top, each of which is adapted to receive one end of a leg in frictional engagement, and a plurality of base members each of which has a base surface and a top surface, the top surface comprising means adapted to frictionally engage the other end of the leg to provide a floor-engaging member having greater slip-resistance than the leg, and the base surface comprising means adapted for direct frictional engagement with the sockets in the underside of the table top, when the base member is inverted, to provide surface-engaging supports for the table top in the absence of the legs.

3,865,051

## FOLDING ARTICLE OF FURNITURE

Anton Johl, and Winfried P. H. Malich, both of Montreal, Quebec, Canada, assignors to Louis Ethan Ltd., Montreal, Quebec, Canada

Filed Apr. 6, 1973, Ser. No. 348,690
Int. Cl. A47b 3/00
U.S. Cl. 108—132 6 Claims



1. An interlocking corner joint for an article of furniture comprising a first and a second interlocking connector strip secured to an edge of a respective one of two members hinged together to form a joint, said connectors being elongated strip-like edge connectors secured respectively to an angulated joint edge of said members and extending beyond the outer planar surface of its associated member to provide a protective edge along the interconnected outer edges of said members, one of said connectors being provided with an elongated ridge receivable in interlocking relationship in an elongated cavity in said other connector, said members being hinged to provide arcuate displacement of said first and second connectors about a fulcrum located outside the center axis of said corner joint whereby said members can be collapsed one on top of the other and in predetermined spaced apart relationship.

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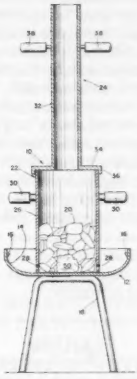
3,865,052

## CHARCOAL STARTER DEVICE

Charles E. Streets, 508 N. 68th East Ave., Tulsa, Okla. 74136, and Robert S. Hembree, 1420 S. New Haven, Tulsa, Okla. 74112

Filed Oct. 15, 1973, Ser. No. 406,587
Int. Cl. F23b 3/00
U.S. Cl. 110—1 F 6 Claims

1. A charcoal starting device for igniting untreated charcoal briquettes and comprising a kindling container for receiving kindling material and untreated charcoal briquettes prior to kindling thereof, said container being adapted for removably setting directly on the grating or pan of a charcoaler and containing the briquettes in close relationship to each other, means for allowing outside air into the lower portion of said kindling container, an elongated flue member removably attachable to the upper portion of said kindling container for facilitating the creation of an air draft through the said charcoal starting device, means for removing the kindling container after the briquettes have ignited thereby depositing said lighted briquettes on the grating or pan for immediate use.



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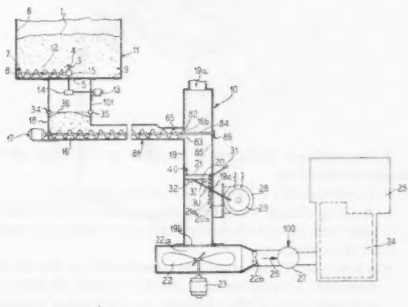
3,865,053

## PARTICULATE WASTE PRODUCT FIRING SYSTEM

Bruce Alan Kolze, and Melvin W. Kolze, both of 10302 Don Pico Rd., Spring Valley, Calif. 92077

Filed Apr. 17, 1974, Ser. No. 461,725
Int. Cl. F23k 3/00
U.S. Cl. 110—7 A 11 Claims



1. A bottom unloading system for particulate material comprising:

a particulate material cylindrical storage container including a bottom wall with a central opening therein, a cylindrical side wall having an annular restraining means attached thereto and above said bottom wall and a deflector means axially aligned with and in working relationship to said central opening,

a radially free-sweeping, non-arching conveyor screw means extending along said bottom wall from said central opening to said side wall of the storage container,

a wheel means attached to an outer end of said conveyor screw means adjacent to said side wall of the container in working relationship thereto for contacting said bottom wall and said restraining means, operable to maintain said conveying means at a substantially parallel distance above said bottom wall of the container and prevent said

conveyor screw means from ascending above said restraining means of said container,

an electromotive means connected to the conveyor screw means operable to rotate said conveying means about its longitudinal axis,

a sonic control means positioned below said central opening within a discharge area in operable relationship to a discharge from said storage container and communicating with said electromotive means to control the energy input thereto in response to a desired accumulation level of discharged particulate material,

whereby the sonic control means generates a signal to said electromotive drive means in response to the level of discharge from said container and the drive means rotates said conveying screw means about its longitudinal axis causing frictional engagement of said wheel means with said bottom wall, resulting in the radially free-sweeping movement of said conveying screw means about the bottom wall of said container and uniform unloading of said particulate material from said container at a rate sufficient to maintain a constant desired level of discharge below said container.

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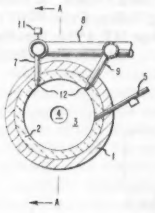
**3,865,054**

## CYCLONIC INCINERATOR

**Elmer S. Monroe, Jr., Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 30, 1973, Ser. No. 411,300**
**Int. Cl. F23g *5/12***
**U.S. Cl. 110—8 C** **5 Claims**



1. A cyclonic incinerator capable of burning chemical wastes comprising:

a. a cylindrically shaped combustion chamber,

b. feeding means for introducing waste to be burned into one area of said chamber, said area being near one end of the chamber,

c. a first row of convergent nozzles parallel to the axis of the combustion chamber, said nozzles capable of directing air into said area of the chamber in a direction tangentially with respect to the circumference of the chamber,

d. means for adjusting the rate of air flow from said first row of nozzles in relation to the amount of waste introduced into the chamber or the temperature within the chamber,

e. a second row of convergent nozzles parallel to the axis of the combustion chamber and spaced apart from the first row, said nozzles being smaller in diameter than the nozzles in the first row and capable of directing a fixed amount of air tangentially into said area of the combustion chamber at such a velocity to maintain turbulence in said chamber, and

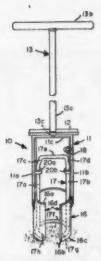
f. in the opposite end of the chamber from said area wherein the waste and air are introduced, an exit means for exhausting the gases created by combustion in an axial direction, said exit being smaller in diameter than the chamber, being centered on the axial center line of the chamber, and forming an angle with the end of the chamber.

**3,865,055**

## PLANT TRANSPLANTER

**John W. Gilbaugh, 19396 Monte Vista Dr., Saratoga, Calif. 95070**

**Filed Apr. 26, 1973, Ser. No. 354,751**
**Int. Cl. A01c *1/00***
**U.S. Cl. 111—4** **5 Claims**



1. A plant transplanter for extracting and transplanting a plant consisting of a sharpened cylindrical blade with a vertical side plant entry opening extending along a side portion of said cylindrical blade, a rectangular frame with bottom side members fixedly attached to the opposite top side portions of said cylindrical blade, a foot bar mounted fixedly on top of said rectangular frame for application of foot pressure for easy insertion of said cylindrical blade into the ground, a cross bar handle fixedly attached to said rectangular frame at the central portion of said foot bar to press and guide said cylindrical blade downwardly into the soil around said plant to be extracted and for use in rotation of said cylindrical blade to loosen said plant before lifting said cylindrical blade containing said plant from said ground, said rectangular frame is provided with guide eyes mounted on the inner side of the side members of said retangular frame to slidably receive and control the vertical alignment of a reciprocating plant ejector means provided with an ejector ring fixedly and horizontally connected to the lower ends of two side rod members with the upper extremities of said side rod members formed into a rectangular and horizontal configuration to provide a foot piece for applying pressure downwardly to eject said plant from said cylindrical blade, said ejector foot piece extends outwardly from said rectangular frame side members on the side opposite said plant entry opening which is centrally aligned between said side members of said rectangular frame in said side portion of said cylindrical blade to prevent obstruction of entry of said plant or damage thereto by said downwardly pressure and movement of said ejector foot piece, said ejector ring is received within said cylindrical blade with said ejector ring moving upwardly in said cylindrical blade as said cylindrical blade is inserted into said ground around said plant to be extracted from said ground, and said ejector ring moves downwardly within said cylindrical blade when said plant is ejected by application of pressure on said ejector assembly foot piece which moves said ejector side rod members received in said guide eyes slidably downward and forces said ejector ring to eject said extracted plant usually into a hole made by said transplanter.

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**3,865,056**

## SEWAGE DISPOSAL SYSTEM AND APPARATUS

**Jack De Wayne Danford, Watkins, Colo., assignor to Jack D. Danford and H. H. Champlin**

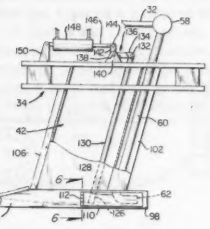
**Filed June 15, 1972, Ser. No. 263,183**
**Int. Cl. A01c *23/02***
**U.S. Cl. 111—7** **11 Claims**

1. Sewage disposal apparatus comprising:

a main frame adapted to be positioned at a selected level above the surface of the ground;

at least one vertically elongate and laterally narrow shank secured to and depending from the frame and adapted to penetrate the ground to a selected depth;

a plow member secured to the lower end of the shank, including an axially elongate foot of substantially greater width than the shank to form a disposal tunnel beneath the surface of the ground;



controllably adjustable power operated servo means to vary the cross sectional area of the foot during operation of the apparatus to vary the cross sectional area of the tunnel formed by the plow member;

the shank including means defining a downwardly extending sewage discharge flow path from the vicinity of the frame to the vicinity of the plow member; and

a dispensing port at the lower end of the flow path to discharge sewage into the tunnel, and a supply manifold at the upper end of the flow path.

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**3,865,057**

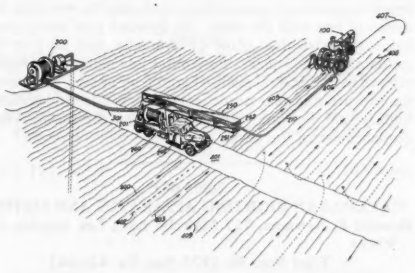
## APPARATUS FOR SUBSOIL IRRIGATION

**Thomas J. Frazier, 2680 Ashford Rd., N.E., Atlanta, Ga. 30319**

**Continuation-in-part of Ser. No. 159,223, July 2, 1971, Pat. No. 3,753,409. This application Oct. 2, 1972, Ser. No. 294,220**

**Int. Cl. A01c** *23/02*

**U.S. Cl. 111—7** **12 Claims**



**1.** A fluid application apparatus adapted to be supported on a translatable vehicle for use in applying a fluid soil conditioning medium to the subsoil of a predetermined area comprising, in combination:

a. frame support means adapted to be carried by translatable vehicle means;

b. means carried by said frame support means for making openings in the soil of an area in which a subsoil application is to be made in response to a traversing operation of said vehicle and frame support means;

c. means carried by said frame support means for applying fluid through said openings into the subsoil of said area; and

d. fluid input conduit means carried on said frame support means, said input conduit means being operable for delivering fluid therethrough from a stationary fluid supply means, said fluid input conduit means including a horizontal portion, pivot means located midway between the sides of said frame support means mounting said horizontal portion for swinging movement through an angle of 180°, said horizontal portion being of a length approximately equal to one-half the width of said frame support means, so that the end of said horizontal portion opposite the pivot means may be swung from a position adjacent one side of the frame support means to a position adjacent the other side thereof, means connecting said horizontal portion at its pivoted end in flow communication to said means for making openings in the soil, and flexible conduit means connected to said end of the horizontal portion opposite the pivot means for establishing flow connection to a fluid supply source.

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**3,865,058**

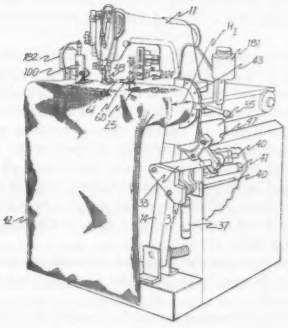
## METHOD AND APPARATUS FOR FORMING AND JOINING HEMS, PARTICULARLY ON TUBULAR ARTICLES

**Herman Rovin, Norwalk; Rudolf Kreidel, Shelton, both of Conn., and Lawrence J. Levine, Valley Stream, N.Y., assignors to Automatech Industries Inc., Bridgeport, Conn.**

**Filed May 30, 1973, Ser. No. 365,098**

**Int. Cl. D05b** *23/00, 35/04, 81/00*

**U.S. Cl. 112—63** **9 Claims**



**1.** The method of forming a continuous hem on a tubular article, which comprises

a. applying the tubular article endwise over spaced sets of inner and outer forms,

b. exerting outward pressure on at least the outer forms to place an open end of the tubular article under circumferential tension,

c. engaging portions of the article adjacent the forms and advancing said portions toward said open end between the inner and outer forms, whereby to progressively withdraw the end margin of fabric from over said outer forms and fold it outward to form a hem fold between said inner and outer forms, and

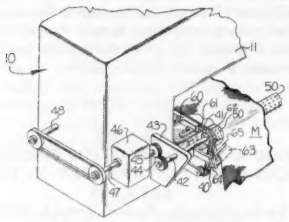
d. exerting outward pressure on at least the inner forms to maintain the folded hem under circumferential tension.

3,865,059

## TUFTING MACHINE WITH POSITIVE POSITIONING MEANS FOR BACKING MATERIAL

Obie R. Jackson, Dalton, Ga., assignor to B & J Machinery Co., Inc., Dalton, Ga.

Filed Mar. 12, 1973, Ser. No. 339,778
Int. Cl. D05c *15/14*
U.S. Cl. 112—79 R 8 Claims



1. A tufting machine for forming narrow gauge pile fabrics including an elongate backing material and yarns penetrating the backing material and forming rows of tufts extending longitudinally of the backing material, said machine comprising

a. a first row of spaced tufting needles mounted for reciprocation in a direction transverse to the backing material and arranged to carry yarns through the backing material to form spaced apart first rows of tufts therein,

b. a second row of spaced tufting needles mounted for reciprocation in a direction transverse to the backing material and arranged to carry yarns through the backing material, said second row of tufting needles being widely spaced from and off-set relative to the needles of said first row to form second rows of tufts in the spaces between the first rows of tufts.

c. pile forming means disposed beneath the backing material for forming pile from the yarns carried by said needles, and

d. positive positioning means for feeding the elongate backing material beneath said first and second rows of spaced tufting needles and for preventing both lateral shifting and longitudinal sagging of the elongate backing material as it moves from said first to said second row of tufting needles, said positive positioning means comprising

1. a pair of endless chains having upper reaches supported for movement transversely of and adjacent opposite ends of said rows of tufting needles,

2. gripping means carried by said chains for engaging the side edge portions of said backing material and for positively maintaining the lateral position of said backing material as it is moved from said first row to said second row of tufting needles by said chains,

3. a rotatable picker roll supported on a fixed axis extending transversely between said chains and parallel to said rows of tufting needles, and including outwardly extending pins adapted to engage the backing material as the same is drawn over said picker roll, and

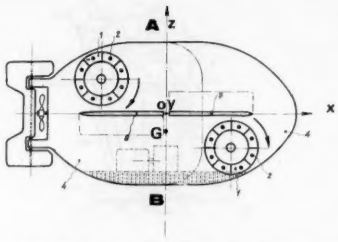
4. drive means for imparting movement to said chains, and for imparting rotation to said picker roll which is coordinated to the speed of movement of said chains.

3,865,060

## SPECIAL SUBMARINE DEVICES USING A NOVEL INTEGRATED LIFT, PROPULSION AND STEERING SYSTEM

Paul Bastide, 108, rue de Rennes, 75006, Paris, France

Filed Apr. 26, 1973, Ser. No. 354,791
Claims priority, application France, Apr. 26, 1972, 72.14768
Int. Cl. B63g *8/08, 8/16*
U.S. Cl. 114—16 R 3 Claims



1. A submarine device capable of perpendicular translation relative to its longitudinal axis inclusive of purely upward and downward movements using an integrated system of lift, propulsion and steering, said submarine device comprising a hull with a center of symmetry, said integrated system comprising four cycloidal propellers grouped in two pairs, one pair being forward on said hull and one pair aft on said hull, each cycloidal propeller having a horizontal axis of rotation and including a flat circular rim carrying at its periphery a circular array of identical horizontal blades each rotatable about a horizontal axis perpendicular to the said rim, means for rotating the blades about their axes including a joint connecting rod for each blade extending parallel to the plane of said rim, and a master control head coupled to said rods and capable of being staggered relative to the axis of rotation of said propeller, said two pairs of cycloidal propellers being symmetrically arranged relative to said center of symmetry of the hull, the two propellers of each pair being coaxial and symmetrical relative to the longitudinal vertical plane of symmetry of the hull, the directions of rotation of the propellers on each side of the hull being in the same directions, the two propellers on each side being longitudinally spaced from each other to minimize interaction of one with the other, the forward pair being lowered below the horizontal plane of symmetry, and aft pair being raised above said plane, horizontal fins extending longitudinally in the horizontal plane of symmetry at each side between the forward and rear propellers on such side, and means for folding said fins into vertical positions for purely vertical displacement of the device.

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3,865,061

## CATAMARAN RIGHTING APPARATUS AND METHOD

Howard F. Newman, 717 Malcolm Ave., Los Angeles, Calif. 90024

Filed Nov. 30, 1973, Ser. No. 420,643
Int. Cl. B63h *9/04*
U.S. Cl. 114—39 14 Claims

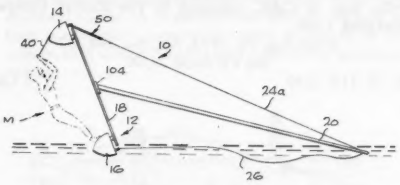
1. In a multihull boat having a lower boat portion with first and second outboard hulls, a mast with a lower end universally pivotally mounted on the lower boat portion and normally extending upwardly therefrom, and a plurality of cables extending from the upper end of the mast to the lower boat portion, including a stay cable extending towards a first end of the boat and a pair of shroud cables extending towards opposite sides of the boat and with directional components towards a second end of the boat opposite the first end, the improvement of apparatus for facilitating the righting of the boat when it capsizes on its side with one hull out of the water, comprising:

first and second holding means for releaseably attaching a point at the lower end of a respective shroud cable to the lower boat portion, to maintain the mast substantially upright for normal sailing;

first and second tensile means, each having a forward end attached to the lower end of a respective shroud cable and having a rearward end; and

first and second attach means for holding the rearwards ends of the respective tensile means to the lower boat portion at positions closer to the second end of the boat than said holding means, whereby when a holding means is released to allow the mast of a capsized boat to pivot away from the hull that is out of the water, the mast is constrained to pivot primarily athwarthships.

**12.** A method for righting a multihull boat which has capsized and which includes a mast buoyant at the top and free to pivot in any direction on the deck and normally maintained




upright on the deck between first and second opposite hulls by cables extending downwardly from the upper portion of the mast to the hull and deck assembly, including a stay cable extending forwardly and a pair of shroud cables extending with an aft direction component and in opposite laterally directions, comprising:

releasing the lower end of the shroud, which lies out of the water, from the hull and deck assembly, and adding a length of a tensile member thereto which is fixed to the hull and deck assembly at a location aft of the position at which the lower end of said shroud was originally attached to the hull and deck assembly, whereby to allow the mast to tip away from the hull that is out of the water while preventing the mast from merely tipping forward, so that the hull that is furthest out of the water can move to a position where its weight does not prevent uprighting of the boat.

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**3,865,062**

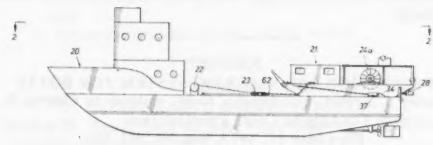
**MARINE GEOPHYSICAL EXPLORATION SYSTEM**

**John J. Babb, Jackson, Miss., assignor to Seiscom Delta Inc., Houston, Tex.**

**Continuation of Ser. No. 87,831, Nov. 9, 1970, abandoned. This application July 17, 1972, Ser. No. 272,096**

**Int. Cl. B63b** *35/00*

**U.S. Cl. 114—43.5** **14 Claims**




**8.** A marine geophysical exploration system for exploring in deep and shallow water comprising:

a geophysical instrumentation and equipment vessel;

a support vessel having space for receiving said geophysical instrumentation and equipment vessel;

a plurality of rollers rotably mounted with said support vessel;

guide means mounted with said support vessel for guiding and supporting said geophysical instrumentation and equipment vessel, said guide means comprising a pair of guideways, one mounted on each side of said support vessel, said guideways comprising horizontal legs supporting said geophysical instrumentation and equipment vessel and vertical legs laterally guiding same; and wherein said rollers are mounted slightly higher than said horizontal legs of said guideways;

means for pulling said geophysical instrumentation and equipment vessel onto said rollers for unloading said geophysical instrumentation and equipment vessel; and

means for controlling the descent of said geophysical instrumentation and equipment vessel from said rollers into the water.

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**3,865,063**

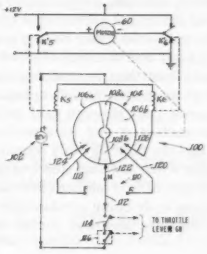
**ELECTRICAL STEERING SYSTEM FOR BOATS**

**Calhoun Norton, Tequesta, Fla., assignor to Arens Controls, Inc., Evanston, Ill.**

**Division of Ser. No. 201,708, Nov. 24, 1971, abandoned, which is a division of Ser. No. 25,874, April 6, 1970, Pat. No. 3,651,779. This application Dec. 13, 1973, Ser. No. 424,290**

**Int. Cl. B63h** *25/24*

**U.S. Cl. 114—144 R** **3 Claims**




**1.** In a control system for a boat having engine means, drive means and clutch means for selectively connecting the engine means to the drive means, the combination comprising: a clutch actuating motor connected to the clutch means for moving the same between engaged and disengaged positions when connecting and disconnecting the engine means and the drive means, three position switch means selectively actuated to forward, neutral, and reverse positions, rotational switch means having contacts coupled between said three position switch means and said clutch actuating motor to cooperate with said three position switch means for running said motor in one direction when said three position switch means is in the forward position and for running said motor in the opposite direction when said three position switch means is in the reverse position, and for running said motor in either said one direction or said opposite direction when said three position switch means is in the neutral position, drive means connected between said clutch actuating motor and said rotational switch means for rotating the same to a position where the contacts thereof are disconnected from said clutch actuating motor to stop the motor selectively at the forward, neutral, and reverse positions, and condition sensing means connected in circuit with said three position switch means to allow enabling of said clutch actuating motor only when a throttle lever associated with the engine means is in a position to have the engine means running at idle speed, said condition sensing means including time delay switch means to provide sufficient time after the throttle has been moved to the idle position to allow the engine speed to completely return to the idle speed.

3,865,064

## ARRANGEMENT FOR ANCHORING A FLOATING BODY

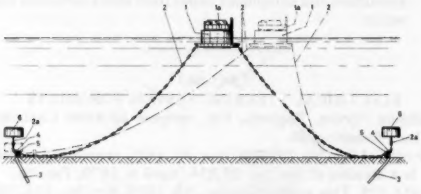
Willem Jan Van Heijst, Monte Carlo, Monaco, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

Filed June 11, 1973, Ser. No. 368,889

Claims priority, application Netherlands, June 12, 1972, 7208003

Int. Cl. B63b *21/46*

U.S. Cl. 114—206 R 3 Claims



1. An arrangement for anchoring a floating body, comprising a plurality of anchor chains secured to and extending below the floating body, a plurality of anchors on the sea bed, each anchor having a guide member through which a said anchor chain slidably extends, a permanently and completely submerged float on the end of each anchor chain remote from the floating body, each said chain having a stop thereon between the floating body and the anchor which stop is closer to the associated said float than to said floating body so as to maintain said float permanently and completely submerged and said stop cannot pass through said guide member, the distance between each stop and its associated said floating body being such that the floating body remains floating on the surface of the water when any said stop engages its associated said anchor, the length of said anchor chain between each said stop and said floating body being substantially greater than the vertical distance between any said anchor and said floating body.

3,865,065

## ANCHOR BOOM

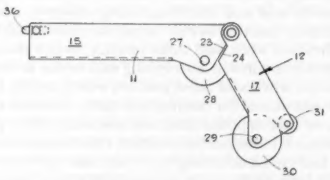
Roy James Dennis, Fulham, and Klemence Kielpikowski, West Beach, both of South Australia, Australia, assignors to Roy James Dennis, Fulham, South Australia, Australia

Filed Oct. 10, 1973, Ser. No. 405,037

Claims priority, application Australia, Oct. 11, 1972, 0786/72

Int. Cl. B63b *21/22*

U.S. Cl. 114—210 6 Claims



1. An anchor boom for the guiding of an anchor rope during raising and lowering of an anchor, and for positioning the anchor shank when the anchor is in its raised position, comprising a mounting bracket having a pair of spaced side walls, a transverse wall joining the mounting bracket side walls and defining therewith an anchor shank guide space, a roller support pin extending between the side walls near the forward end thereof and an inner guide roller journalled on the support pin for rotational movement,

a guide arm also having a pair of spaced side walls joined by a transverse wall, a further roller support pin extending between the guide arm side walls near the forward end thereof, an outer guide roller journalled on the further support pin for rotational movement, bridge means also extending between the guide arm side walls and spaced from the outer guide roller to define therebetween an anchor shank guide space, and

hinge means interconnecting the rear end of the guide arm to said forward end of the mounting bracket, so constructed and arranged that said anchor shank guide spaces are aligned when the anchor is in its raised position.

3,865,066

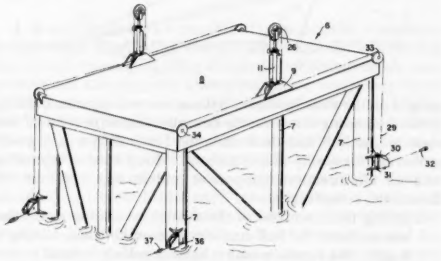
## TENSION MOORING DEVICE

Robert Miles White, Moraga, and Howard John Bates, Danville, both of Calif., assignors to The Rucker Company, Oakland, Calif.

Filed Aug. 22, 1973, Ser. No. 390,387

Int. Cl. B63b *21/00*

U.S. Cl. 114—230 1 Claim



1. A tension mooring device for use in mooring vessels to a marine platform, comprising: an upstanding cylinder mounted on said platform, a piston vertically slidable in said cylinder and defining upper and lower variable volume chambers in said cylinder, an upstanding closed air-oil reservoir adjacent said cylinder, a conduit communicating the lower portion of said reservoir to the lower chamber in said cylinder, a body of oil in the lower portion of said reservoir and extending through said conduit into said lower chamber, a body of air confined in said reservoir above said body of oil, means adjacent said cylinder defining a closed pressure chamber of lesser volume than said reservoir, conduit means connecting the upper portion of said pressure chamber to the upper portion of said upper cylinder chamber, a piston rod secured to said piston and extending upwardly out of said cylinder, a sheave journalled on said piston rod outside said cylinder, and a cable reeved on said sheave and having means for securing the same to a vessel, said cable being directed from said sheave so that tension in said cable urges said piston downwardly in said cylinder.

3,865,067

## PROPULSION AND STEERING SYSTEM FOR BOATS

Farley J. Archer, Los Angeles, Calif., assignor to Charles R. Archer, Los Angeles, Calif.; a part interest

Filed May 17, 1973, Ser. No. 361,201

Int. Cl. B63h *11/04*

U.S. Cl. 115—12 R 5 Claims

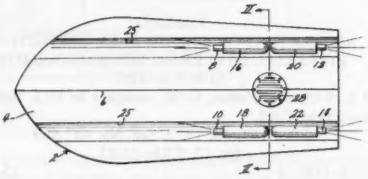
1. A boat propulsion and steering system comprising four jet nozzles carried by the boat hull beneath the water level and operable to direct water jets exteriorly of said hull, two of said nozzles being directed forwardly of the boat and two rearwardly, one forwardly and one rearwardly directed nozzles being disposed at each side of the midline of the boat, powered means operable to deliver water to all of said nozzles for ejection therefrom, the pair of nozzles at each side of the boat

midline being supplied with water from a common conduit which is branched to supply water to the respective associated nozzles, and control means operable to deliver water to said nozzles in variable proportions, whereby to propel and steer said boat, said control means comprising:

a. a pair of diverter gates disposed movably in the respective common conduits and operable by movement thereof to direct proportionately more or less of the water flowing through said common conduit to either of the associated branch conduits,

b. a first diverter gate positioning means operable to position said diverter gates selectively to deliver proportionately more water to either forward nozzle and to the rear nozzle at the opposite side of the boat midline, and proportionately less water to the remaining two nozzles, whereby the boat is steered, and

c. a second diverter gate positioning means operable selectively to deliver proportionately more water either to the rearward nozzles or to the forward nozzles, whereby said boat is propelled respectively either forwardly or rearwardly, said second diverter gate positioning means comprising:



1. a manually movable control member movable in either direction from a neutral position,

2. means responsive to movement of said control member to move said diverter gates, whereby when said control member is in its neutral position said diverter gates are positioned to direct equal amounts of water in total to the forward and rearward nozzles, whereby when said control member is moved in one direction from neutral said diverter gates are positioned to direct proportionately more water to the branch conduits interconnected with the rear nozzles and the boat is propelled forwardly, and whereby when said control member is moved in the other direction from neutral said diverter gates are positioned to direct proportionately more water to the branch conduits interconnected with the forward nozzles, and the boat is propelled rearwardly,

3. resilient means biasing said control member to its neutral position,

4. detent means operable to secure said control member in either its forward or its rearward propulsion position, and

5. manually operable detent control means.

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**3,865,068**

## STERN DRIVE ENGINE MOUNT

**William D. Haasl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Jan. 22, 1973, Ser. No. 325,398**

**Int. Cl. B63h** *5/06*

**U.S. Cl. 115—34 R** **5 Claims**

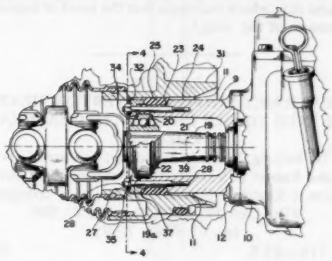
1. In an inboard-outboard marine drive system including an engine, drive shaft assembly, transom plate assembly and outdrive unit, an improved engine mounting arrangement comprising:

a cylindrical drive shaft housing attached to and extending aft of an engine and an aft engine mount assembly attached to and carried by said housing,

said cylindrical housing having an annular step,

said aft mount assembly including an annular elastomeric sealing and vibration absorbing element disposed around and upon said housing with one side abutting said step, and

means movably attached to said housing and abutting the other side of said annular elastomeric element for axially compressing said element against said step and thereby radially expanding said element into radial compression between said housing and said transom plate assembly,



said transom plate assembly including a transom plate having a cylindrical passage therein, said passage having an end opening to the engine side of said transom plate, said cylindrical passage being adapted to axially receive therein through said open end said entire aft mount assembly, so that said entire mount assembly may be thrust into said passage through said open end and secured at various selected positions within said cylindrical passage.

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**3,865,069**

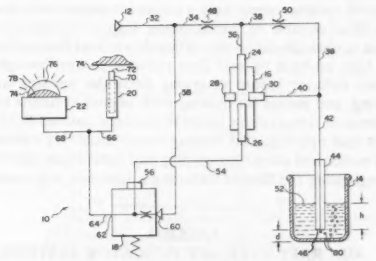
## LIQUID LEVEL INDICATING SYSTEM

**Guenter Ginsberg, Miami, Fla., assignor to Coulter Electronic, Inc., Hialeah, Fla.**

**Filed Apr. 9, 1973, Ser. No. 349,270**

**Int. Cl. G08b** *7/04*; **G01f2** *13/16*

**U.S. Cl. 116—4** **8 Claims**



1. A fluidic liquid level indicating system with an audible alarm, said system being operable from a fluid pressure source and including a fluidic amplifier having an input, a control and an output, a first fluid line between the fluid pressure source and said input, first means for establishing a fluid resistance in said first fluid line to attenuate fluid flow from the fluid pressure source, a second fluid line from said input to the interior of a vessel containing a supply of liquid, said second fluid line having an end opening into the vessel at a predetermined distance above the bottom of the vessel, second means for establishing a fluid resistance in said second fluid line to attenuate fluid flow through said second fluid line, a third fluid line between said control and said second fluid line and connected to said second fluid line at a point between said second means for establishing a fluid resistance and said open end in the vessel, a pilot operated fluid switch having a pilot connection

to the output of said amplifier, said switch being connected between the fluid pressure source and a fluid operated piston and cylinder device having a piston with a striker at the end thereof, a stop adjacent said striker, said fluid resistances being such that when the liquid is at a predetermined height above the open end of said second fluid line, bubbles of fluid escape from said open end causing intermittent output signals at said output of said amplifier which intermittently operate said switch to intermittently apply pressure to said piston and cylinder device to cause intermittent striking of said striker against said stop which indicates that the level of liquid is close to the bottom of the vessel.

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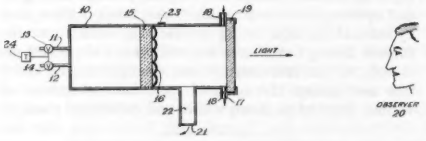
**3,865,070**

## DEVICE AND METHOD FOR CONVERTING HEAT FROM FUEL INTO VISIBLE LIGHT WITH CHANGEABLE COLORS

**Charles W. Solbrig, Idaho Falls, Idaho; Sanford A. Weil, Chicago, and Robert B. Rosenberg, Evergreen Park, both of Ill., assignors to American Gas Association, Inc., Arlington, Va.**

**Filed Oct. 19, 1970, Ser. No. 81,999**
**Int. Cl. G08g** *1/095*
**U.S. Cl. 116—63 R** **8 Claims**




**1.** An apparatus for converting heat from the combustion of fuel into visible lights having predetermined and controllable colors comprising: an opaque housing having an opening at one end thereof for passage of light out of said housing, a plurality of radiators thermally excitable to emit visible colored lights disposed in said housing, said plurality of radiators including a first radiator comprising a ceria-thoria mantle and a second radiator comprising a colored transparent or translucent filter capable of withstanding high temperatures positioned in optically coupled relationship to said first radiator so that light emitted by said first radiator passes through said second radiator before emerging from the opening in said housing, and means for heating each of said radiators to predetermined temperature levels to produce colored lights visible at said opening, said heating means including natural gas inlet means and means for igniting said natural gas, and means for regulating the flow of natural gas into said apparatus.

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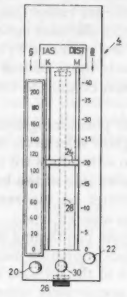
**3,865,071**

## AIRCRAFT TAKE OFF INDICATOR SYSTEMS

**Jehuda Manor, Ramat Hasharon, Israel, assignor to Israel Aircraft Industries, Ltd., Lod Airport, Israel**

**Filed Aug. 23, 1973, Ser. No. 390,710**
**Claims priority, application Israel, Aug. 25, 1972, 40203**
**Int. Cl. G09f** *9/00;* **G06f** *15/50*
**U.S. Cl. 116—129 R** **5 Claims**

**1.** An aircraft indicator system, comprising: a first measuring device measuring aircraft air speed and having a first scale displaying said measurement, a second measuring device measuring distance covered during take-off run and having a second scale displaying said measurement; said second scale being parallel to and laterally of said first scale; and a presettable marker disposed to bridge both of said scales and presettable so as to be aligned with a predetermined point on the second scale corresponding to the point-of-no-return of the aircraft upon take-off, and with a predetermined point on the first scale corresponding to the indicated air speed at that point to assure a safe take-off, whereby visual observation during take-off of the measurements displayed by the two scales with reference to said presettable marker provides a




continuous indication of whether the minimum air speed for a safe take-off will be reached before the point-of-no-return.

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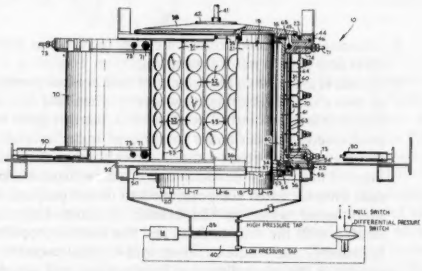
**3,865,072**

## APPARATUS FOR CHEMICALLY DEPOSITING EPITAXIAL LAYERS ON SEMICONDUCTOR SUBSTRATES

**Earl L. Kirkman, Felton, Calif., assignor to HLS Industries, Sunnyvale, Calif.**

**Filed Oct. 18, 1973, Ser. No. 407,569**
**Int. Cl. C23c** *13/12*
**U.S. Cl. 118—4** **23 Claims**



**1.** Apparatus for depositing an epitaxial layer on substrates by the chemical vapor deposition of reactant gases and carrier and diluent gases on the exposed surface of the substrates, comprising:

a. an outer wall defining a chamber;
b. a susceptor disposed within said chamber, said susceptor being arranged to support substrates;
c. a porous wall in said chamber disposed in the path of travel of the carrier and diluent gases for mixing the carrier and diluent gases advancing toward said susceptor, said porous wall defining one wall of a reaction chamber and confronting said susceptor;
d. means external to said reaction chamber for conducting carrier and diluent gases toward said porous wall;
e. means for supplying reactant gases to said reaction chamber;
f. conduits in said reaction chamber communicating with said reactant gas supply means and having orifices disposed adjacent the gas-exiting surface of said porous wall for discharging reactant gases to mix with the mixed carrier and diluent gases, said mixed carrier and diluent gases and said reactant gases mix after the mixed carrier and diluent gases advance from the gas-exiting surface of said porous wall to form a mixture of gases contacting the exposed surfaces of the substrates; and

g. a heater for heating said susceptor for effecting an epitaxial deposition on the exposed surfaces of the substrates in response to said mixture of gases contacting the exposed surfaces of the substrates.

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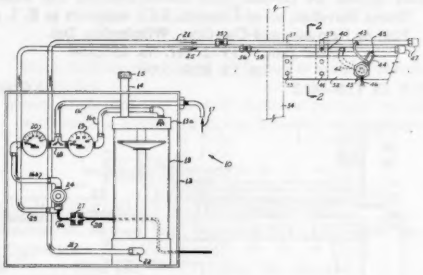
**3,865,073**
**MATERIAL MARKING APPARATUS**

**Leonard G. Jahn, 1140 Ridge Rd., Green Bay, Wis. 54304**

**Filed Aug. 31, 1973, Ser. No. 393,609**
**Int. Cl. B05c** *5/00, 11/00*
**U.S. Cl. 118—8** **4 Claims**



1. In a counter-actuated apparatus for marking materials at predetermined intervals, the combination of a reservoir for a marking liquid, a normally closed jet type liquid marking valve located at a marking station remote from said reservoir, liquid conduit means connecting said reservoir to said marking valve, a pneumatically operated actuator for opening said liquid marking valve, a normally closed solenoid air valve located adjacent said reservoir, material counter responsive means for momentarily opening said air valve at predetermined intervals, a compressed air supply connected to said reservoir for pressurizing the liquid therein and in said liquid conduit means, said air supply also being connected to said air valve, and air conduit means connecting said air valve to said pneumatically operated actuator for said marking valve whereby the latter may be momentarily opened as a function of opening of said air valve so that the marking valve may spray a marking jet of liquid on the material to be marked.

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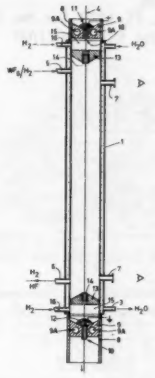
**3,865,074**
**DEVICE FOR COATING A WIRE OF AN ELECTRICALLY CONDUCTING MATERIAL CONTINUOUSLY FROM THE GAS PHASE**

**Gerardus Antonius Petrus Maria Cornelissen; Johannes Cornelis Norbertus Rijpers, and Gerardus Henricus Maria Siebers, all of Emmasingel, Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.**

**Filed Apr. 24, 1974, Ser. No. 463,737**
**Claims priority, application Netherlands, May 5, 1973, 7306306**
**Int. Cl. C23c** *13/10*
**U.S. Cl. 118—49.5** **3 Claims**

1. A device for coating a wire of an electrically conducting material continuously from a gas phase by contacting a gas providing the coating with an electrically heated wire part, which device comprises a tubular reaction chamber provided with at least one inlet and outlet for the gas providing the coating and with seals at both ends through which the wire is passed, the seals each comprising a wire filling of metal wire serving as an electrical contact with the wire to be coated, and transverse partitions at each end of said reaction chamber spaced from said seals defining chambers arranged in series with the reaction chamber, inlet means to introduce an inert gas into said latter chambers, said partitions each being provided with two apertures through which the wire to be coated is passed.



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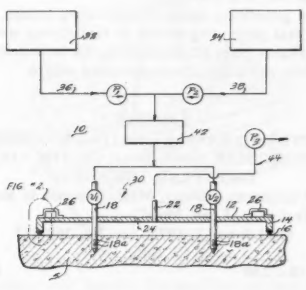
**3,865,075**
**SLAB IMPREGNATION APPARATUS**

**James H. Klein, Mattituck; Anthony J. Romano, Kings Park; Lawrence E. Kukacka, Port Jefferson, and Joseph J. Fedelem, Blue Point, all of N.Y., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Oct. 4, 1973, Ser. No. 403,586**
**Int. Cl. B05c** *9/08*
**U.S. Cl. 118—50** **7 Claims**



1. Apparatus for impregnating a slab of concrete with a liquid mixture comprising:

a. impregnator means for contacting said slab of concrete and forming therewith a closed chamber;

b. hollow injector probe means extending through said impregnator means and terminating within said slab of concrete, said probe means having openings at the end thereof terminating within said slab;

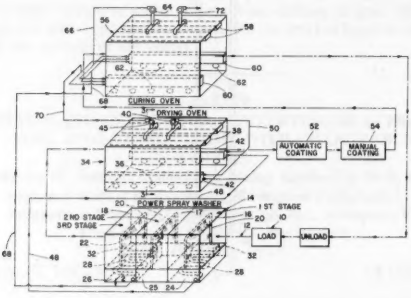
c. means for maintaining a negative pressure within said closed chamber; and

d. means for simultaneously supplying said liquid mixture to said probe means for delivering said mixture within said slab of concrete, said liquid mixture within said slab effectively displacing air being removed by said negative pressure maintaining means.

## 3,865,076
## FINISHING LINE HEAT RECOVERY

**Richard G. Wick, Downers Grove, and Henry J. Bennett, Palos Park, both of Ill., assignors to Burdett Manufacturing Company, Bridgeview, Ill.**

**Filed Aug. 27, 1973, Ser. No. 391,731**
**Int. Cl. B05c *11/00***
**U.S. Cl. 118—66** **15 Claims**




13. An article finishing line and coating system including a spray washing station for washing the articles with a heated liquid, a tank for containing the washing liquid having an immersion conduit means therein through which hot gases are conducted to heat the washing liquid, a coating station for coating the articles, a curing station for curing the coating on the articles, conveyor means for conveying the articles between said stations, and a drying station along said conveyor means between said spray washing station and said coating station, wherein the improvement comprises in combination therewith:

conduit means conducting a first portion of the hot exhaust gases from said immersion conduit means directly to said curing station and a second portion of said hot exhaust gases from said immersion conduit means to said drying station and then to said curing station in parallel relationship to said first portion,

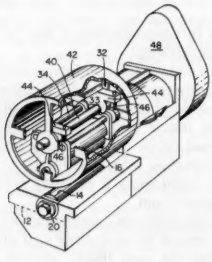
first heat generating means in said curing station, and

second heat generating means in said drying station, said hot exhaust gases supplementing the heat generated by said first and second heat generated means.

## 3,865,077
## ADAPTOR TO ENABLE COATING MACHINE TO ACCOMMODATE SHOE SOLE OR THE LIKE OF IRREGULAR THICKNESS

**Alton R. Copithorne, Rowley, Mass., assignor to Boston Machine Works Co., Lynn, Mass.**

**Filed June 12, 1973, Ser. No. 369,217**
**Int. Cl. B05c *1/02***
**U.S. Cl. 118—250** **10 Claims**

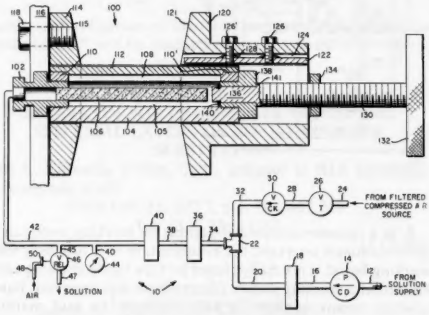


1. An attachment for a coating machine having a base, a bottom applicator roll partially immersed in a fluid cement, a feed roll and a base mount carrying said feed roll, said base mount being constrained for movement about an axis of said base mount toward and away from said applicator roll, said attachment comprising an auxiliary mount constrained for movement with respect to said base mount, a drum rotatably mounted on said auxiliary mount for disposal of the shell of said drum between said feed roll and said applicator roll, said feed roll resting longitudinally against the inside surface of said drum, and means for biasing the inner surface of said drum against said feed roll.

## 3,865,078
## FOAM FINISH APPLICATOR

**Jack Renato De Howitt; Imre Mirko Jonkoff, and Robert Ernest Stoveken, all of Camden, S.C., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed June 5, 1972, Ser. No. 259,664**
**Int. Cl. B05c *5/02***
**U.S. Cl. 118—612** **3 Claims**




1. An apparatus for preparing and applying a foam solution from a pressurized gas and a liquid finish to a textile web moving in a path including means for moving the tow in said path, said apparatus comprising: an elongated housing positioned across said path, said housing having walls forming an inner chamber and having a longitudinal slot through one wall, said slot being in communication with said chamber and disposed toward said path; a distribution plate fitted in said slot, said plate having outer and inner surfaces connected by a plurality of holes, said outer surface being adjacent said path, said holes expanding to a larger diameter at said outer surface; a source of liquid finish; a source of pressurized gas; means for mixing said liquid finish and said gas; and a diffusion filter positioned in said chamber, said filter being supplied with a mixture of liquid finish and gas by said means for mixing.

## 3,865,079
## ELECTROSTATIC FLUID BED POWDER COATING SYSTEM

**Roger W. Kellams, Anderson, and Clarence H. Dyer, Warren, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 27, 1973, Ser. No. 391,578**
**Int. Cl. B05c *5/02***
**U.S. Cl. 118—621** **4 Claims**

1. In an electrostatic fluid bed powder coating system having a powder fluidizing bed, a source of fluidizing gas therefor, and means for moving an elongated workpiece horizontally and axially across said bed above the surface of fluidized powder therein, charging apparatus comprising:

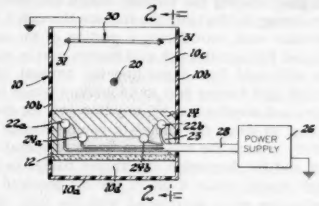
a voltage source;

a pair of elongated charging electrodes in said bed below the surface of the fluidized powder therein, said electrodes extending parallel to the axis of said workpiece and being located symmetrically on opposite sides of said axis and radially equidistant therefrom;

means connecting said electrodes to said voltage source;

a control electrode located above said workpiece and having portions directly above and extending parallel to and substantially coextensive with each of said charging electrodes, said portions being located the same radial distance from the axis of said workpiece as are said charging electrodes;

means connecting said control electrode portions and said workpiece to a voltage different from that of the charging electrodes.

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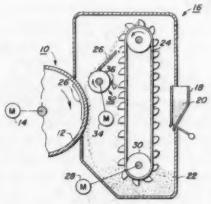
**3,865,080**

## TONER PICKOFF APPARATUS

**Frederick W. Hudson, West Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 17, 1973, Ser. No. 324,466**
**Int. Cl. G03g *13/00***
**U.S. Cl. 118—637** **12 Claims**



1. In an electrostatic copier having a photosensitive surface for carrying an electrostatic latent image, a development system for developing said latent image through the use of a developer having toner particles triboelectrically attracted to carrier particles; said development system comprising the combination of means for transporting said developer along a path leading to said photosensitive surface and means along said path and upstream of said photosensitive surface for electrostatically withdrawing from said developer improperly charged toner particles which would otherwise tend to be attracted to background areas of said image; said withdrawing means including segmented member having at least one pair of conductive segments electrically insulated from each other, and means for providing an electrical potential between said segments, thereby establishing a field for selectively attracting improperly charged toner particles from said developer.

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**3,865,081**

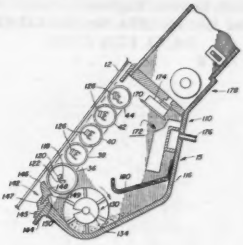
## MAGNETIC BRUSH DEVELOPING APPARATUS

**Terrence D. Charland, Pittsford, and Stanley D. Klett, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 255,721, May 22, 1972, abandoned. This application Feb. 4, 1974, Ser. No. 439,195**
**Int. Cl. G03g *13/08***
**U.S. Cl. 118—637** **1 Claim**

1. In a magnetic brush developing apparatus for applying developing materials to a photoconductive surface including electrostatic latent images in an electrostatic printing machine, having a housing defining a sump zone and wherein a cross-mixing baffle is provided to redistribute depleted developing material within said sump zone, the improvement comprising:

a U-shaped screen member positioned below said cross-mixing baffle and extending the width of said housing.



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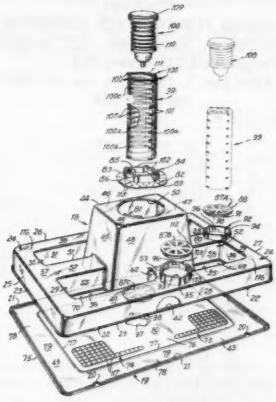
**3,865,082**

## SMALL ANIMAL PLAYGROUND

**David D. Lovitz, Short Hills, N.J.; Ness Eastman, Rego Park, and William H. Davidson, Katonah, both of N.Y., assignors to The Hartz Mountain Corporation, Harrison, N.J.**

**Filed Nov. 19, 1973, Ser. No. 418,281**
**Int. Cl. A01k *1/00***
**U.S. Cl. 119—17** **12 Claims**

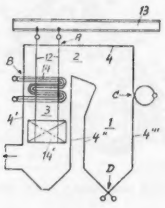


1. A playground housing for small animal pets comprising a basic unit having a transparent main housing member and a base tray thereunder, said member comprising a chamber defined by a plurality of lateral walls and a roof, said chamber being open at the bottom, a main apertured portion in said roof, a peripheral tunnel defined by laterally opposite sides, a roof and a floor, and channel means communicating between said chamber and tunnel, said channel means being defined by laterally opposite walls and a top wall, the bottom portions of said channel means being open, said tray having a portion thereof underlying and constituting the floor of said chamber, the peripheral portions of said tray underlying and constituting the floor of said tunnel, a tower detachably connected to said apertured portion and when connected being in communication with said chamber, said tower having along the inner surface thereof ledge climbing means for the animal, ar detachable closure means for said apertured portion.

## 3,865,083
## TUBE FITTING

Heinz Kohn, Oberhausen, Germany, assignor to Babcock & Wilcox Limited, London, England

Filed Jan. 16, 1974, Ser. No. 433,927
Int. Cl. F22b *37/10*
U.S. Cl. 122—235 R 3 Claims

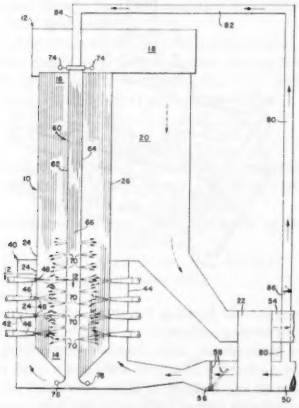


1. A vapor generator including spaced fluid heating tubes, some of said tubes being interconnected by webs to form wall means defining a gas enclosure, wherein the improvement comprises at least one fitting of unitary construction seal weldably connected to said wall means and including a plurality of uniformly spaced coplanar first tubular segments, means sealing the spacing between adjacent first tubular segments, each of said first tubular segments being flow connected to a corresponding wall tube, at least one second tubular segment extending through the sealing means in cross flow relation and contiguous to said first tubular segments, said second segment being flow connected to one of said fluid heating tubes.

## 3,865,084
## INNER FURNACE AIR CHAMBER

David C. De Poister, Morristown, N.J., assignor to Foster Wheeler Corporation, Livington, N.J.

Filed Jan. 7, 1974, Ser. No. 431,243
Int. Cl. F22b
U.S. Cl. 122—235 B 5 Claims



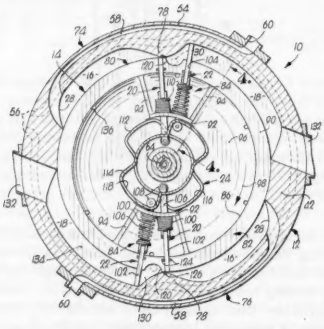
1. A furnace assembly comprising a housing formed by a plurality of interconnected walls, a plurality of burners associated with at least one of said walls, means for supplying an air-fuel mixture to said burners for combusting in said housing, an enclosure extending within said housing and formed by interconnected walls, a wall of said enclosure extending parallel to said one wall of said housing and having a plurality of openings respectively facing said burners, said latter enclosure wall being formed by a plurality of interconnected finned tubes, and means for supplying air to said enclosure for discharging through said openings and towards said burners for mixing and combusting with the unburnt fuel from said burners, and means for passing water through said tubes to cool said tubes and the air discharging through said openings.

4. A method of burning a fuel-air mixture in a furnace to produce a minimum amount of nitrogen oxides in the combustion gases leaving the furnace, which comprises the steps of introducing the fuel into the furnace through a burner port in a furnace wall, introducing a portion of the combustion air into said furnace through said burner port in mixing relationship with said fuel, regulating the amount of air supplied through said burner port to an amount which is less than the theoretical combustion air requirements for the corresponding fuel to delay the complete combustion of said fuel and thereby reduce the maximum flame temperature in the furnace and the formation of nitrogen oxides below the values which would occur if all of the air required for complete combustion were introduced with the fuel, discharging the remaining amount of air required to insure complete combustion of the fuel through openings extending through a wall of an enclosure disposed within said furnace, said remaining amount of air being directed towards said burner port and in a direction opposite the direction of discharge of said fuel and air so as to mix said remaining amount of air with the unburnt portion of said fuel to complete the combustion of said fuel, and cooling the wall of said enclosure through which said openings extend to cool said remaining amount of air.

## 3,865,085
## ROTARY ENGINE

Joseph Stenberg, Rt. 1, Box 7B, Linn Creek, Mo. 65052

Filed June 8, 1973, Ser. No. 368,335
Int. Cl. F02b *53/08*
U.S. Cl. 123—8.33 1 Claim



1. A rotary engine comprising:

a cylindrical, dished rotor having a central hub axially offset to one end thereof;

a housing enclosing said rotor and presenting a plurality of spaced-apart chambers arranged circumferentially about said rotor and adjacent the periphery thereof,

alternate ones of said chambers defining a compression chamber having a fuel inlet and a power chamber having an exhaust outlet, said rotor being mounted on a shaft journalled in said housing for rotation therein;

at least one pair of spaced, substantially radially reciprocable sliding valve mechanisms carried by said rotor and transversely disposed in a fore-and-aft relative relationship with respect to the direction of rotation of said rotor with a first one of said valve mechanisms defining a compression valve for cooperation with said compression chamber and a second one of said valve mechanisms defining a power valve for cooperation with said power chamber,

each valve mechanism including a paddle-like vane transversely disposed relative to said chambers, a rod having an outer end to which a said vane is affixed and spring

means operably coupled with said rod for biasing the vane in an outward direction relative to the periphery of said rotor;

control means carried by said housing and operably coupled with said valve mechanisms for controlling the shifting movements of said vanes into and out of corresponding ones of said chambers in a predetermined sequence,

said control means including:

a first stationary cam member supported by said housing interiorly thereof for controlling the reciprocable movement of said power valve and a second stationary cam member secured to and supported by said first cam member for controlling the reciprocable movement of said compression valve;

a cam follower secured on each valve mechanism rod at an inner end thereof opposite a corresponding vane with said spring means being disposed between the vane and the cam follower,

said cam members being perpendicularly positioned and axially aligned relative to the axis of rotation of the rotor and located within said housing in a disposition substantially centrally of the concavity presented by said dished rotor,

each cam member presenting a flanged segment having a continuous inner surface facing the axis of rotation of said rotor and along which a corresponding cam follower travels in uninterrupted engagement therewith,

said flanged segments being axially spaced apart in an opposed, oppositely facing relationship relative to each other with the valve mechanism rods passing between the opposed flanged segments during revolution of the rotor and reciprocating along respective paths of travel that are in a common plane normal to the axis of rotation and is substantially centrally disposed relative to the axial length of said rotor and the width of said vanes,

each of said surfaces having a configuration arranged to permit radially reciprocable movement of its associated valve mechanism to shift the vane thereof into and out of its corresponding chamber according to a predetermined sequence and in response to the biasing action of its spring means as the rotor revolves; and

fuel supply means and fuel combustion means operably associated with respective ones of said chambers for cooperation with said valve mechanisms whereby a driving force is imparted to said rotor when combustion takes place.

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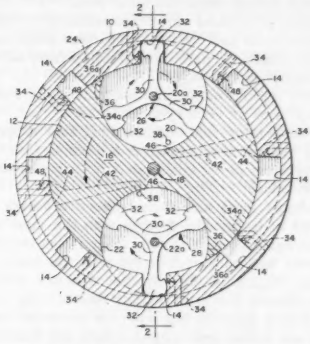
**3,865,086**

## ROTARY INTERNAL COMBUSTION ENGINE

**Choong-Gil Lee, Honolulu, Hawaii, assignor to Lee & Lee Research Laboratories, Honolulu, Hawaii**

**Filed Aug. 22, 1973, Ser. No. 390,406**
**Int. Cl. F02b** *55/14*
**U.S. Cl. 123—8.45** **8 Claims**

1. An internal combustion rotary engine, comprising a housing having a circular interior cavity with equally spaced recessed notches formed about the circumference thereof, a disc-shaped rotor disposed coaxially within said housing cavity for sealing rotation therein, said rotor having a pair of opposite radial recesses formed in the circumference thereof, each having a partial circular cross-section in a plane perpendicular to the axis of rotation of said rotor, a lever wheel being disposed for rotation within each said recess of said rotor about the geometrical axis of each said recess, said lever wheel having a plurality of equally spaced radial arms extending into sealing slidable contact with the sidewall of the corresponding rotor recess, the ends of respective ones of said radial arms being formed to engage successive ones of said notches, a plurality of rotatable combustion chambers being defined between adjacent ones of said radial arms, means for introducing a combustible mixture into the interior of each said rotor recess, ignition means mounted in said housing between each pair of adjacent notches for causing ignition of said combustible mixture in the reduced volume defined between the inside of said housing cavity and two adjacent radial arms whose ends are simultaneously engaging consecutive notches, whereby the force of combustion tends to pivot said lever



wheel about the end of one of its radial arms engaging one of said notches to drive the geometrical axis of rotation of said lever wheel about the rotational axis of said rotor, and means for relieving the exhaust gases from the interior of said rotor recess.

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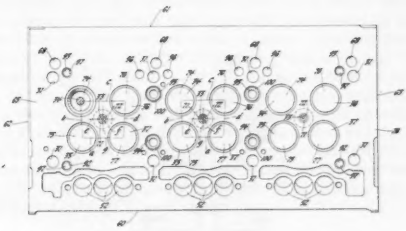
**3,865,087**

## DIESEL ENGINE AND CYLINDER HEAD THEREFOR

**Tanas M. Sihon, Ypsilanti, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 5, 1974, Ser. No. 476,579**
**Int. Cl. F02b** *75/02*; **F02d** *39/04*
**U.S. Cl. 123—65 VC** **3 Claims**



1. An internal combustion engine comprising

a cylinder block having a top wall and a plurality of longitudinally aligned closely spaced cylinders,

a cylinder head having lower and side walls, said cylinder head being mounted with said lower wall sealingly opposing the top wall of said block so as to close the ends of said cylinders,

a plurality of injectors, one for each cylinder location, carried in said head and centered in their respective cylinder axes, said injectors each having a body portion including a thickened outer part intermediate the outer valves of each cylinder location,

a plurality of exhaust passages extending laterally within said cylinder head, and opening through one of said side walls, said exhaust passages connecting at each cylinder location with four exhaust ports opening through said lower wall at locations spaced around the respective injector opening for said cylinder location, said exhaust passages being bifurcated with separate legs extending on opposite sides of said injector opening, one of said legs connecting with the two exhaust ports to the rear of said cylinder location and the ohter of said legs connecting

with the two exhaust ports to the front of each cylinder location, one of the ports connecting with each leg comprising an inner port disposed at the end of its respective exhaust leg and the other of said ports comprising an outer port disposed closer to the side wall outlet of its exhaust passage than said inner port,

a plurality of exhaust valves reciprocably carried in said cylinder head and closing said exhaust ports, said valves being openable to permit exhaust flow from said cylinders to said exhaust passages,

valve and injector actuating means including a plurality of rocker arms for each cylinder location,

means supporting said rocker arms, said support means being secured to said cylinder head and extending beside the locations of the inner valves of their respective cylinder locations,

said exhaust ports and their respective valves being arranged in trapezoidal fashion with the inner and outer valves being laterally equally spaced from the axis of said cylinder and injector tube but with the inner ports and valves being longitudinally spaced closer to the axis of said cylinder and injector tube than are the outer ports and valves whereby the inner valves avoid interference with said rocker arm support means and the outer valves avoid interference with said injector body thickened portion.

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**3,865,088**

## MEANS FOR HYDRAULICALLY CONTROLLING THE OPERATION OF INTAKE AND EXHAUST VALVES OF INTERNAL COMBUSTION ENGINES

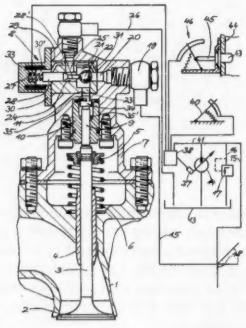
**Heinz Links, Gansheidistrasse, 76A, 7, Stuttgart, Germany**

**Filed Oct. 19, 1971, Ser. No. 190,525**

**Claims priority, application Germany, Oct. 19, 1970, 2051220**

**Int. Cl. F01l** *9/02*

**U.S. Cl. 123—90.12** **2 Claims**



1. In means for hydraulically controlling the operation of a tappet valve in a cylinder associated with an internal combustion engine, the improvement comprising

A. a slidably held work piston in engagement with said tappet valve, said work piston, during its reciprocation, causing similar displacement of said tappet valve,

B. means for delivering liquid under pressure to said work piston for causing reciprocation thereof, said last-named means including a liquid delivery pump,

C. intermittently actuated solenoid valve means disposed in the path of said liquid between said pump and said work piston for intermittently admitting liquid under pressure to said work piston,

D. means for controlling the output of said pump to control the pressure of said liquid for controlling the stroke amplitude of said tappet valve and

E. engine temperature-responsive thermostatic control means applying signals to said means defined in (D) for varying the stroke amplitude of said tappet valve as a function of the engine temperature in the same sense as the change of the latter.

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**3,865,089**

## METHOD AND SYSTEM TO REDUCE POLLUTING EMISSION FROM INTERNAL COMBUSTION ENGINES

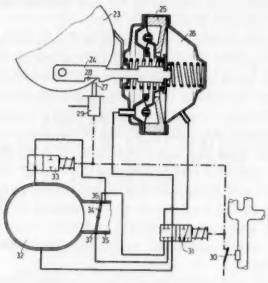
**Dieter Eichler, Hochberg; Otto Glockler, Renningen, and Richard Bertsch, Asperg, all of Germany, assignors to Robert Bosch GmbH, Gerlingen-Schillerhohe, Germany**

**Filed June 29, 1972, Ser. No. 267,562**

**Claims priority, application Germany, Jan. 21, 1972, 2202786**

**Int. Cl. F02p** *5/04*

**U.S. Cl. 123—117 R** **19 Claims**



1. System to reduce polluting components from the exhaust of internal combustion engines during warm-up of the engine, in combination with an engine having an inlet manifold, a throttle, timing control means operable within a predetermined range for timing the ignition of the engine, within said range, with respect to piston position, and an exhaust system including an exhaust manifold, said pollution reducing system comprising

means (**25, 26, 51, 52**) continuously effective during engine operation to adjust the ignition timing of the ignition system within said range, comprising a spark advance vacuum chamber means (**25, 26**) to advance or delay ignition timing within said range with respect to dead-center position of the piston;

adjustment link means (**24**) connected to the ignition timing adjustment means;

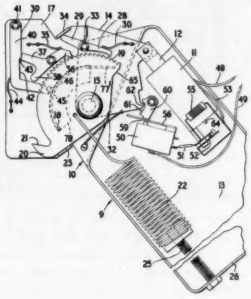
means controlling additional retardation of ignition timing of the ignition system, to a delay value of such magnitude that combustion will persist during at least a portion of the exhaust stroke of the engine in addition to the adjustment of the ignition timing, within said range, due to said continuously effective ignition timing means, comprising a control valve (**31**) interconnecting the spark delay chamber (**25**) to the inlet manifold of the engine during warm-up time of the engine and before the engine has reached said predetermined temperature, said valve (**31**) connecting the delay chamber to a suction port (**37**) located in the vicinity of the throttle (**34**) in the inlet to the engine;

and means (**30**) responsive to temperature arising in the exhaust system of the engine during operation thereof, said temperature responsive means including means controlling the extent of travel of said link element to disable control by said additional ignition timing retardation means when said temperature responsive means senses that a predetermined temperature is exceeded.

## 3,865,090
## CONTROL SYSTEMS ESPECIALLY FOR DIESEL ENGINE INSTALLATIONS

**George Ernest Masters, Stourbridge; John Kenneth Bache, Wolverly, Near Kidderminster, and Ralph Rowland Absalom, Micklefield Green House, Sarratt, Rickmansworth, Hentfordshire, England, assignors to said Absalom, by said Masters and Bache**

**Filed June 20, 1972, Ser. No. 264,659**
**Int. Cl. F02b** *77/08*
**U.S. Cl. 123—139 AZ** **13 Claims**



**1.** A control system of a compression-ignition or diesel engine installation which includes a fuel injection pump having a shut-off control mechanism, said control system comprising:

a. biasing means operatively connected to the shut-off control mechanism of the fuel injection pump to bias said pump to an inoperative off position,

b. an electro-mechanical actuator responsive to a supply of electrical current for automatically setting the fuel injection pump to an operative on or engine-running position,

c. said electro-mechanical actuator including drive means, a solenoid device, means to cause said solenoid device to be energized intermittently and to operate repetitively and continuously through successive operating cycles, and means adapted to advance the drive means stepwise and unidirectionally from an initial position to a terminal position when the solenoid device is energized,

d. said drive means being operatively connected to the fuel injection pump,

e. an electrical supply circuit means for providing a supply of electrical current to the solenoid device,

f. switch means for opening the supply circuit to stop the supply of electric current, and

g. means for causing the drive means to return the pump automatically from said on position to the inoperative off position by the biasing means when the electric current is stopped.

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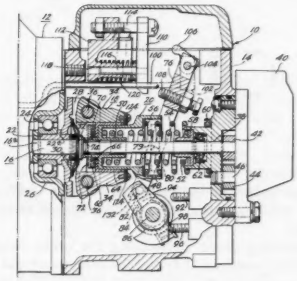
## 3,865,091
## EXCESS FUEL STARTING DEVICE FOR DIESEL ENGINES

**Norvan W. Bostwick, Longmeadow, and Ignace J. Daborowski, Springfield, both of Mass., assignors to Ambac Industries, Inc., Springfield, Mass.**

**Filed Feb. 19, 1974, Ser. No. 443,196**
**Int. Cl. F02m** *59/42*
**U.S. Cl. 123—139 ST** **6 Claims**

**1.** In a diesel engine fuel injection pump governor having a governor shaft driven at a speed proportional to engine speed, a non-rotating sleeve slidably disposed on said shaft, a flyweight assembly mounted on said shaft for rotation therewith and having at least one flyweight rotatably mounted to swing radially outwardly in response to centrifugal forces during rotation of said shaft, said flyweight in the rest position being disposed in contiguous relation to said sleeve, means on said flyweight for moving said sleeve along said shaft in response to radial movement of said flyweight, spring means acting on said sleeve opposing sleeve movement by said flyweight, a fulcrum lever pivotally connected at a point remote from its ends to said sleeve, an engine fuel control rod, a first end of said fulcrum lever being connected to said engine fuel control rod, a full load stop plate adjacent said first fulcrum lever end, means on said fulcrum lever end for engaging said stop plate to limit the travel of said fulcrum lever end and control the full load fuel delivery position of said fuel control rod, a trunnion lever pivotally connected to the second end of said fulcrum lever, an operating lever shaft rotatably disposed adjacent said fulcrum lever, said trunnion lever being rotatably mounted on



said operating lever shaft, spring means connecting said trunnion lever with said operating lever shaft to resiliently rotate said trunnion lever with said operating lever shaft in at least one direction, and an operating lever connected to said operating lever shaft, the improvement comprising spring means associated with said stop plate permitting movement of said stop plate to an excess fuel position under a predetermined force of said fulcrum lever thereagainst, means on said flyweight for locking said flyweight to said sleeve during cranking of the engine to prevent radial flyweight movement and axial sleeve movement, and means connecting said operating lever shaft directly with said fulcrum lever second end during engine cranking at full throttle setting to provide said predetermined force of said fulcrum lever against said full load stop, thereby establishing an excess fuel position of said stop and of said fuel control rod.

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## 3,865,092
## MAGNETO IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Peter Schmaldienst, Nurnberg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed July 11, 1973, Ser. No. 378,195**
**Claims priority, application Germany, Aug. 7, 1972, 2238871**
**Int. Cl. F02p** *1/17*
**U.S. Cl. 123—148 E** **6 Claims**

**1.** Magneto ignition system for internal combustion engines having a spark plug, comprising

a magneto generator (**10**) having a main winding (**14**);

an energy storage element (**16**) supplied by the generator;

controlled switching means (**18**) having a control terminal (**18***a*) to permit application of stored energy in a storage element to the spark plug (**19**);

and a pulse source (**20**) having one terminal (**20***b*) connected to the control terminal (**18***b*) to trigger the controlled switch (**18**) into conduction and thus apply stored energy to the spark plug, wherein the improvement comprises

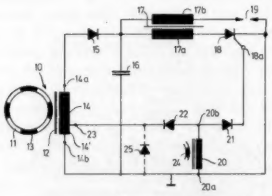
an auxiliary winding (**14'**) on the magneto generator (**10**); and unsymmetrical conduction means (**21, 22**) connecting

a. the auxiliary winding (**14'**) of the magneto to the pulse source and

b. the pulse source (**20**) to the control terminal (**18*a***),

said unsymmetrical conduction means being logically connected to the auxiliary winding (**14'**) and to the pulse source (**20**) to become conductive only if both the pulse source and the auxiliary winding provide, simultaneously, an instantaneous output voltage of predetermined polarity; wherein

the auxiliary winding and the unsymmetrical conduction means form a reverse rotation inhibiting circuit comprising



a cross connection between one terminal (**14*b***) of the auxiliary winding and one terminal (**20*a***) of the pulse source (**20**);

a connecting diode connecting the other terminal of the auxiliary winding (**23**) and the other terminal (**20*b***) of the pulse source (**20**), said diode being poled in conductive direction to transfer generated voltage pulses in said auxiliary winding to the pulse source (**20**);

and a coupling diode (**21**) poled in conductive direction to connect the other terminal (**20*b***) of the pulse source with the control terminal (**18*a***) of the controlled switching means (**18**) to provide trigger pulses to the controlled switch only when the voltages from the pulse source and the auxiliary winding are of proper polarity to energize the controlled switching means.

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**3,865,093**

**MACHINE DRIVEN BY ROTARY PISTONS**

**Miguel Ferragut Rodriguez, Paseo Santa Maria de la Cabeza, Madrid, Spain**

**Filed Nov. 1, 1972, Ser. No. 302,922**

**Claims priority, application Spain, Nov. 4, 1971, 396667**

**Int. Cl. F02b** *57/02*

**U.S. Cl. 123—44 D** **8 Claims**

**1.** A rotary machine for use as either a generator or a receiver of movement, said machine comprising:

A. a stator casing having therein at least one cylindrical inner surface;

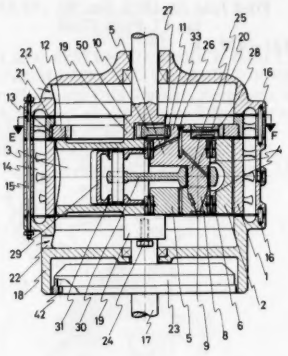
B. at least one rotor unit mounted within said casing adjacent a respective at least one inner surface thereof, each of said at least one rotor units comprising:

a cylindrical rotor body having an outer peripheral surface in contiguous contact with said respective inner surface of said stator casing, a single dead-end radial recess formed in said outer peripheral surface;

a piston-rod mechanism mounted to reciprocate within said recess;

a cylindrical opening extending transversely completely through said rotor body in communication with the inner end of said radial recess, said cylindrical opening having an axis parallel to but offset from the longitudinal axis of said rotor body;

a two-piece crankshaft having an outer diameter less than the diameter of said cylindrical opening and having the opposite ends thereof pivotally supported in said cylindrical opening about said axis thereof, said piston-rod mechanism being connected to an eccentric journal of said crankshaft, said eccentric journal being within said outer diameter of said crankshaft, said crankshaft at one end thereof having an extension;



a pinion rotatably supported on said extension; and

a ring gear rigidly fixed to said stator casing and meshing with said pinion; and

C. shaft means connected to the outermost of said at least one rotor unit at the rotor body thereof in alignment with said longitudinal axis thereof.

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**3,865,094**

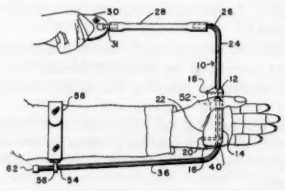
**ARM BRACED AND STABILIZED SLINGSHOT**

**Robert Sweeney, 8230 S.W. 27 Ln., Miami, Fla. 33155**

**Filed June 11, 1973, Ser. No. 369,078**

**Int. Cl. F41b** *7/00*

**U.S. Cl. 124—20 R** **5 Claims**



**1.** An arm braced and stabilized slingshot comprising a generally upright handle,

a fork extending from an upper end of said handle,

said fork adapted for attachment of elastic bands,

a substantially L-shaped single rod having a shorter leg releasably engaged to said upright handle and a longer leg extending substantially horizontally therefrom,

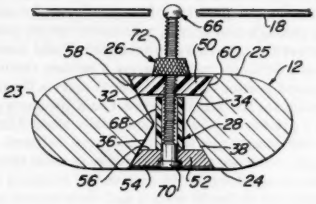
arm engaging strap means for fastening around the arm of a user and having tab means for guiding said rod, said tab means extending downwardly from said strap means, said rod's longer leg slidably engaging said tab means, and

retaining means on said rod's longer leg for preventing accidental disengagement of said rod and said tab means.

## 3,865,095
## ARCHERY BOW WITH VERTICALLY ADJUSTABLE SIGHTING DEVICE

James C. Helmick, Grayling, Mich., assignor to Victor Comptometer Corporation, Chicago, Ill.

Filed Oct. 15, 1973, Ser. No. 406,166
Int. Cl. F41b 5/00
U.S. Cl. 124—24 R 7 Claims




1. An archery bow comprising a handle provided with a window area portion defined by relatively closely spaced longitudinally extending side surfaces of the handle and an arrow rest portion extending transversely thereacross,

an elongated sight mounting guideway integrally formed within the window area portion of the handle extending longitudinally of the handle and transversely to the arrow rest portion,

the guideway comprising a first pair of recessed inclined elongated guide surfaces on the handle defining a first elongated guide shoe slot opening toward one of said side surfaces of the handle and a second pair of oppositely facing recessed inclined elongated guide surfaces on the handle defining a second elongated guide shoe slot opening toward the other of said side surfaces of the handle, said guide surfaces intersecting centrally of said window area portion of the handle between the spaced side surfaces of the handle and defining an elongated connecting slot in the handle connecting the first and second elongated guide shoe slots,

a first guide shoe member slidably mounted in said first elongated guide shoe slot,

a second guide shoe member slidably mounted in said second elongated guide shoe slot,

adjustable connecting means extending axially between said first guide shoe member and said second guide shoe member through said connecting slot and supportively connecting said first and second shoe members so as to be longitudinally movable simultaneously as a unit along said guideway and adjustably connecting said first and second shoe members so as to be relatively movable transversely of said guideway to selectively frictionally retainingly engage and release said shoe members relative to said first and second pair of recessed inclined elongated guide surfaces to permit longitudinal adjustment, and

a sight member supported by and carried with said first and second shoe member.

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## 3,865,096
## ARCHERY BOW ARROW REST

Fernando Troncoso, Jr., 1851 South Orange Ave., Monterey Park, Calif. 91754

Filed Dec. 28, 1973, Ser. No. 429,358
Int. Cl. F41b 5/00
U.S. Cl. 124—24 R 10 Claims

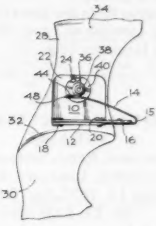
1. A combination comprising:

a. an archery bow having a bow handle portion, said bow handle portion having an arrow window defined by a generally horizontal bow shelf and a generally vertical sidewall; and

b. an improved arrow rest comprising, in combination,

i. a generally horizontal base support disposed over said shelf in said window,

ii. a resilient, vertically depressible, elongated, freestanding, forwardly projecting means rising above said base support and spaced generally parallel to said sidewall a substantial distance therefrom sufficient to permit the free passage of an arrow feather therebetween and for permitting, primarily, vertical displacement under the load of an arrow resting thereon.




iii. securing means releasably securing one end of said arm to said base support for adjustable positioning of said arm towards and away from said sidewall, and,

iv. attaching means for releasably attaching said arrow rest to said sidewall.

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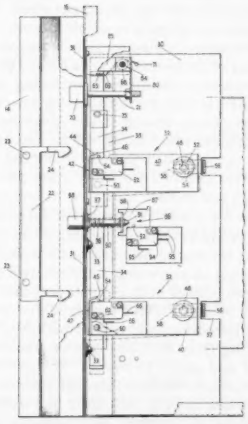
## 3,865,097
## LATCH FOR MICROWAVE OVEN

Donald B. Robinson, Framingham, Mass., assignor to Sage Laboratories, Inc., Natick, Mass.

Filed May 23, 1974, Ser. No. 472,544
Int. Cl. F23m 7/00
U.S. Cl. 126—197 10 Claims



1. A latch assembly for securing a microwave oven door to the face of the microwave oven comprising:

means fastened to the cantilevered end of the oven door for securing the door to the oven face and including at least one latch,

said face having at least one aperture to receive the latch,

a latch receiving means including means defining an edge for engagement with the latch when the door is closed,

means for pivotally supporting said latch receiving means with said edge disposed intermediate the oven face and the pivot point,

a sliding element arranged to move in a generally vertical direction,

means freely securing said latch receiving means to said sliding element so that as said sliding element moves said latch receiving means is free to pivot about the pivot point,

means for biasing the sliding element to a position wherein the latch and latch receiving edge are in engagement when the door is closed

and means accessible from the front of the oven for actuating the sliding element to cause the latch to disengage from the latch receiving edge.

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**3,865,098**

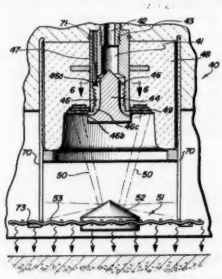
## HEATER FOR ASPHALT CONCRETE ROADWAYS AND THE LIKE

**Earl F. Cutler, Lawrence, Kans., assignor to Cutter Repaving Associates, Incorporated, Lawrence, Kans.**

**Filed June 13, 1973, Ser. No. 369,775**

**Int. Cl. F23c** *5/00*

**U.S. Cl. 126—271.2 A** **10 Claims**



**1.** Equipment for heating the upper strata of asphalt concrete pavement, comprising in combination: a heating chamber having chamber-forming walls including a roof adapted to overlie an area of the pavement to be heated by radiant energy heat, said chamber-forming walls including downwardly extending peripheral side portions having lower edges thereof adapted to be closely spaced to the pavement, a plurality of radiant heating units positioned within said heating chamber substantially completely to provide a uniform area of radiant heat within said chamber for heating the pavement therebeneath, each of said radiant heating units including, a combustion chamber for connection to an air fuel supply to receive an air fuel mixture therein for burning of the air fuel mixture, nozzle means secured to said combustion chamber, said nozzle means having an axis which is aligned with said combustion chamber, a plurality of orifices extending through said nozzle means, each of said orifices having a first portion oriented substantially parallel to said axis of said nozzle and a second portion leading from said first portion and directed radially outwardly of said nozzle to change the direction of the products of combustion which pass through said nozzle, a deflector means positioned radially outwardly and axially downstream of said combustion chamber, said deflector means having a portion thereof adjacent said second portion of said orifices to receive the products of combustion therefrom and redirect said products of combustion to a predetermined location axially aligned but longitudinally displaced from said nozzle, and infrared radiant heating target means located substantially in coincidence with said predetermined location to receive the products of combustion from said deflector means and convert said products of combustion substantially entirely to infrared radiant heat energy, said target means comprising an imperforate target element displaced for direct impingement by said products of combustion, and a cross grid screen wire structure extending outwardly thereof.

**6.** A radiant heating unit comprising in combination, a combustion chamber including means for connection to an air fuel supply which delivers an air fuel mixture to the combustion chamber for burning therein, nozzle means secured to said combustion chamber, said nozzle means having an axis which is axially aligned with said combustion chamber, a plurality of orifices extending through said nozzle means, each of said orifices having a first portion oriented substantially parallel to said axis of said nozzle and a second portion leading from said first portions and directed radially outwardly of said nozzle to change the direction of the products of combustion which pass through said nozzle, a deflector means positioned radially outwardly and axially downstream of said combustion chamber, said deflector means having a portion thereof adjacent the second portion of said orifices to receive the products of combustion therefrom and redirect said products of combustion to a predetermined location axially aligned but longitudinally displaced from said nozzle, and infrared radiant energy target means located substantially in coincidence with said predetermined location to receive the products of combustion from said deflector means and convert said products of combustion substantially entirely to infrared radiant heat energy, said target means comprising an imperforate target element displaced for direct impingement by said products of combustion, and a cross grid screen wire structure extending outwardly thereof.

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**3,865,099**

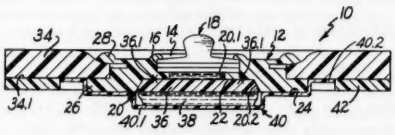
## MEDICAL ELECTRODE AND METHOD OF MAKING

**Robert H. Robichaud, Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed May 18, 1973, Ser. No. 361,683**

**Int. Cl. A61b** *5/04*

**U.S. Cl. 128—2.1 E** **8 Claims**

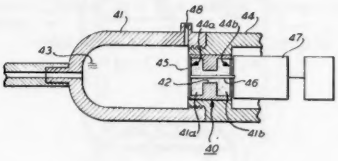


**1.** A medical electrode unit comprising a dielectric body having a cavity therein which is open at one end, said body having a step surface within said cavity forming a relatively small cavity portion spaced from said open cavity end and a relatively larger cavity portion adjacent said open cavity end, means secured to said body around said open cavity end for securing the electrode unit to a patient, a conductive electrode element disposed within said relatively smaller cavity portion spaced from said step surface, said electrode element having means extending away from said cavity out of said dielectric body for permitting electrical connection to be made to the electrode element, a resilient, dielectric foam pad having pores extending therethrough secured to said step surface of said body within said relatively larger cavity portion in spaced relation to said conductive electrode element and having a surface of said pad extending adjacent said open cavity end, electrolyte paste filling said relatively smaller cavity portion in wetting relation to said conductive electrode element, filling said pores of said foam pad, and forming a mound of said electrolyte paste on said pad outside said cavity, and a cover releasably secured against said dielectric body over said open cavity end, said cover having a surface engaging said electrolyte paste over substantially all of said open cavity end.

## 3,865,100
## APPARATUS FOR MEASURING BLOOD PRESSURE

Hiroshi Kanai, Tokyo, and Yuji Kimura, Kawasaki, both of Japan, assignors to Hiroshi Kanai, Kanagawa and Yuji Kimura, Tokyo, both of, Japan

Filed Apr. 19, 1973, Ser. No. 352,828
Int. Cl. A61b 5/02
U.S. Cl. 128—2.05 D 5 Claims




1. An apparatus for measuring blood pressure comprising, a catheter having an open distal end which is to be inserted into a blood vessel of a patient and a proximal end;

a hollow housing to one end of which is connected said proximal end of the catheter;

the internal diameter of a greater portion of said housing being substantially greater than that of the catheter;

a substantially dumbbell-shaped damping member disposed in said hollow housing and having first and second cavities with first and second flexible diaphragms respectively and a tube connecting said first and second cavities, the internal diameter of said cavities being substantially equal to that of said hollow housing and the internal diameter of said tube being smaller than that of said cavities inside of said damping member, said damping member being filled with damping liquid having a viscosity greater than that of a physiological saline solution filled in said catheter and a space formed by an inner surface of said hollow housing and said first diaphragm of said first cavity;

a pressure transducing means provided behind said second cavity of said damping member viewed from the catheter and responsive to blood pressure variations through a body of physiological saline solution filled in said catheter and said space in said housing and said damping member to produce an output representative of said blood pressure variations; and

an indicator means connected to said pressure transducing device for indicating said blood pressure variations.

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## 3,865,101
## PORTABLE AND SEPARABLE HEART MONITOR AND HEART DEFIBRILLATOR APPARATUS

Lawrence Saper, Westwood; George Heller, Glen Rock, and David Hitchcoff, Westwood, all of N.J., assignors to Datascope Corp., Paramus, N.J.

Filed May 1, 1974, Ser. No. 465,897
Int. Cl. A61b 5/04
U.S. Cl. 128—2.06 R 7 Claims

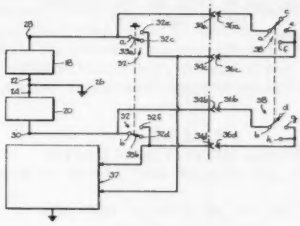
1. A portable unit including heart monitor and heart defibrillator portions which comprises:

a. a removable heart-monitoring portion having a self-contained power supply, said monitoring portion capable of monitoring a patient's heart, while positioned in said unit or removed therefrom;

b. first switch means for interrupting the flow of electric power between said power supply and electrical circuits within said monitor portion when said monitoring portion is positioned in said unit;

c. second switch means within said defibrillator; and

d. means for electrically connecting said power supply and said electrical circuits within said monitoring portion to said second switch means, said second switch means



operable to connect said power supply to said electrical circuits.

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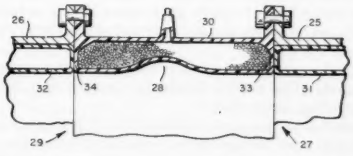
## 3,865,102
## EXTERNAL CARDIAC ASSIST APPARATUS

William C. Birtwell, North Scituate, R.I., and Robert L. Norton, Norfolk, Mass., assignors to Hemodyne, Inc., Norfolk, Mass.

Filed June 13, 1973, Ser. No. 369,447
Int. Cl. A61h 7/00
U.S. Cl. 128—64 29 Claims




1. Apparatus for providing external assistance for the circulation of blood in a patient comprising

housing means for enclosing a portion of said patient's body;

means for cyclically applying pressure to said body portion within at least a portion of said housing means, said pressure applying means including

pressure actuation means;

a pressure medium positioned in said portion of said housing means between said pressure actuation means and said portion of the patient's body, said pressure medium being responsive to said pressure actuation means to apply pressure to said body portion;

means for synchronizing the operation of said pressure actuation means to apply said pressure cyclically to produce alternating compression and decompression of said body portion in synchronism and in correct phase with said patient's heartbeat;

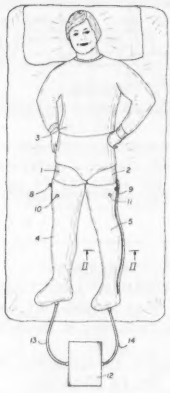
at least a portion of said housing means comprising rigidizable means which is in a non-rigid state when applied to or placed on said patient and which is capable of substantially conforming to any of a plurality of different shapes of the portion of said patient's body to which it is applied when in said non-rigid state, said rigidizable means being further capable of assuming a rigid state and retaining said conformity when in said rigid state; and

means for rigidizing said rigidizable means for operation of said apparatus.

## 3,865,103
## BLOOD CIRCULATING DEVICE

**Ralph Folman, Toronto, Ontario, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Nov. 8, 1973, Ser. No. 414,155**
**Int. Cl. A61h** *7/00*
**U.S. Cl. 128—64** **2 Claims**



1. A blood circulating device for the limbs of a body, said device comprising
   - a pair of airtight sleeves each adapted to encase a corresponding limb of a body, each sleeve having an inner wall adjacent the limb and an outer wall spaced from the inner wall;
   - a pair of steady slow air release valves each in a corresponding one of the sleeves for slowly releasing air in the corresponding sleeve; and
   - a source of compressed air coupled to both sleeves at points spaced from the air release valves and means for pulsatingly supplying air to each sleeve between the inner and outer walls thereby encouraging blood circulation in the encased limbs, the air being slowly released from the sleeves via said valves.

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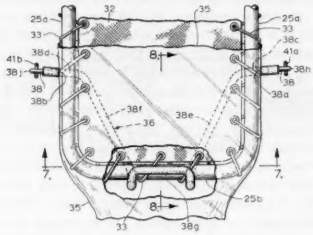
## 3,865,104
## CONNECTING DEVICE FOR PLASTIC ENCASED HYDROTHERAPY PLINTH

**Donald L. Paulson, Rolling Meadows, and Anthony C. Mamo, Arlington Heights, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Nov. 2, 1973, Ser. No. 412,385**
**Int. Cl. A61h** *9/00*
**U.S. Cl. 128—66** **4 Claims**

1. In a hydrotherapy treatment system wherein a patient is supported partially immersed in a water-filled whirlpool tank on an elongated plinth having a rectangular rigid metallic frame of tubular construction and formed by pairs of coplanar side rails and end rails, the plinth being encased in a disposable, flexible water-tight plastic sleeve to prevent patient cross-contamination, and wherein a pair of rigid suspension struts upwardly connect each end of the plastic encased plinth to an overhead hoist, a connecting device for interconnecting a predetermined end of the plastic encased plinth to its associated pair of suspension struts, comprising:
   - a continuous, uninterrupted, symmetrically shaped metallic rod which is bent to provide
   - a pair of parallel upright portions that are perpendicular to the plane defined by the frame and embrace the plastic encased plinth at support points along the side rails close to but inward from the plinth's predetermined end,
   - a pair of coplanar supporting portions each of which is adjacent and perpendicular to a respective one of said upright portions and each of which lies beneath and supports a respective one of the side rails at its support point,
   - a centrally-located upwardly extending hook-shaped portion, equidistant from said supporting portions,



   which hooks over the end rail at the plinth's predetermined end to maintain said connecting device attached to the plastic encased plinth,
   - and a pair of eye-shaped portions at respective ends of said metallic rod and lying outboard from the side rails;
   - and a pair of coupling elements each of which intercouples a respective one of said eye-shaped portions to a respective one of the suspension struts.

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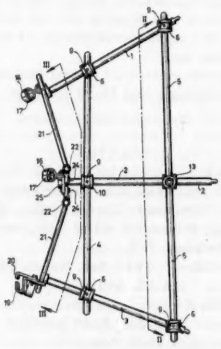
## 3,865,105
## DEVICE FOR EXERTING FORCES ON AND FIXING THE SPINAL COLUMN OF A HUMAN BODY

**Freerk Lode, Groningen, Netherlands, assignor to Lode's Instrumenten N.V., Groningen, Netherlands**

**Filed May 9, 1974, Ser. No. 468,343**
**Claims priority, application Netherlands, May 16, 1973, 7306853**
**Int. Cl. A61f** *5/37*
**U.S. Cl. 128—69** **6 Claims**



1. A device for exerting forces on the spinal column of a human body, comprising a frame including
   - three or more fastening members which each can be fixedly secured to a vertebra of the spinal column,
   - connecting means connecting the fastening means mutually in such a way that they can freely move with respect to each other, and
   - fixation means fixing the fastening members in such a way with respect to each other that each of the fastening

members is prevented from moving in a plane perpendicular to the connecting line through the two other fastening members, and adjusting means connected to the frame, for exerting a force on one of the fastening members, the force being situated in a plane which is perpendicular to the connecting line of the two other fastening members and the force being equal to the sum of the forces exerted on the two other fastening members.

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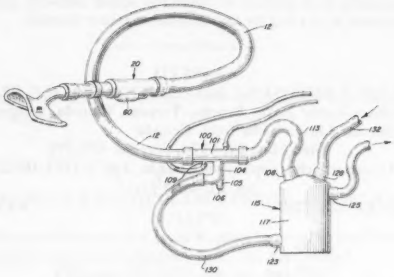
**3,865,106**

**POSITIVE PRESSURE BREATHING CIRCUIT**

**Bernard P. Palush, 1607 E. Cedar Ln., Mount Prospect, Ill. 60056**

**Filed Mar. 18, 1974, Ser. No. 451,855**
**Int. Cl. A61m** *17/00*
**U.S. Cl. 128—145.8** **34 Claims**



**1.** A positive pressure breathing circuit for operation in conjunction with a positive pressure ventilator useful in connection with respiratory therapy, comprising in combination, a concentrically oriented inhalation/exhalation circuit having an inner inhalation tube and an outer exhalation tube, said outer exhalation tube being spaced from and concentrically oriented with respect to said inner inhalation tube positioned therein,

said inner inhalation tube having a patient receiving terminal at one end thereof and a gas source terminal at the opposed end thereof,

said outer exhalation tube having a patient receiving terminal at one end thereof and an exhaust end at the opposed end thereof,

inhalation unidirectional valve means associated with said inhalation tube for providing unidirectional gas flow through said inhalation tube,

exhalation unidirectional valve means associated with said exhalation tube for providing unidirectional gas flow through said exhalation tube,

inflatable occlusion means interposed between said inner inhalation tube and said outer exhalation tube adjacent said patient receiving terminal and in fluid communication with a source of pressurized fluid such that said inflatable occlusion means is alternatively inflatable during the inhalation phase and deflatable during the exhalation phase in response to fluid pressure from the source thereof,

the gas flow in said inhalation tube being countercurrent with respect to the gas flow in said exhalation tube thereby to stabilize and maintain the temperature of the gas within said inner inhalation tube without any extraneous source of heat, while at the same time permitting inflation of said inflatable occlusion means during the inhalation cycle and thereby to resist any back pressure caused during the inhalation cycle as well as to avoid any cross-contamination of the gases in the inhalation tube with the gases in the exhalation tube,

whereby gas suitable for patient inhalation enters said circuit through said inner inhalation tube under positive pressure and through said inhalation unidirectional valve means to the patient during which time said inflatable occlusion means is fully inflated and interposed between said inner inhalation tube and said outer exhalation tube and prevents cross contamination of gases while resisting any back pressure existing in said circuit while exhaled gases flow through said exhalation unidirectional valve means in countercurrent relation with respect to the gas within said inner inhalation tube, said inflatable occlusion means being deflated during the exhalation cycle thereby to permit exhaled gases to exit from said circuit.

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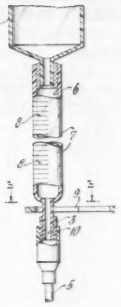
**3,865,107**

**INFANT TUBE FEEDING ADAPTER**

**Raymond W. Barton, 7900 Peterbury Rd., Evansville, Ind. 47711**

**Filed Sept. 19, 1973, Ser. No. 398,709**
**Int. Cl. A61j** *07/00*
**U.S. Cl. 128—222** **4 Claims**



**1.** An infant tube feeding device, adapted for delivering fluid from a calibrated container to a gavage tube, comprising a translucent flexible connector, said connector having a reduced diameter proximate said gavage tube and being calibrated to permit delivery to said gavage tube of accurately measured, small quantities of said fluid; a flow clamp, said clamp positioned on said flexible connector proximate said gavage tube and having means for regulating fluid flow thereto; and a semi-rigid fitment, said fitment providing a connection for said flexible connector to said gavage tube.

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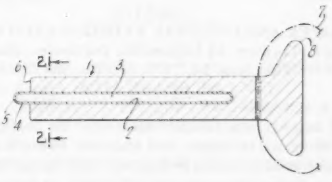
**3,865,108**

**EXPANDABLE DRUG DELIVERY DEVICE**

**William L. Hartop, Bernardsville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.**

**Continuation-in-part of Ser. No. 144,174, May 17, 1971, abandoned. This application July 9, 1973, Ser. No. 377,350**
**Int. Cl. A61m** *31/00*
**U.S. Cl. 128—260** **10 Claims**



**1.** A device for the delivery of a medicament to a body cavity comprising a base, said base at least partially defining a medicament containing zone of restricted dimensions, said base being expandable and incorporating a material which expands sufficiently upon contact with body fluids to expand

said base, said material being selected from the group consisting of brown algae, polysaccharides derived from brown and red seaweeds, biosynthetic polysaccharides, natural gums, cellulose derivatives, synthetic resins derived from cellulose, polyacrylamide, polyvinylpyrrolidone, ethylene oxide polymers, and modified starches, and said medicament containing zone being disposed in pressure responsive relation to said expandable base such that upon insertion of the device into a body cavity pressure is exerted on the medicament containing zone as a result of resistance to expansion by the base within the body cavity which causes the base to compress the medicament containing zone resulting in the medicament contained therein being dispensed into the body cavity.

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**3,865,109**

## COLOSTOMY FECAL POUCH VENTING MEANS

**Austin E. Elmore, and Ernest A. Uhlmann, both of 4533 N. Scottsdale Rd., Scottsdale, Ariz.**

**Filed Mar. 16, 1973, Ser. No. 341,857**
**Int. Cl. A61f** *5/44*
**U.S. Cl. 128—283** **9 Claims**

**1.** A colostomy attachment of a soft, resilient, moisture proof material with self venting means for gases trapped therein comprising:

a closed pouch for receiving fecal matter,

said pouch being provided with an opening thereinto of sufficient size for surrounding a stoma opening of a user, and

venting means for said pouch comprising a first flexible, substantially flat surfaced pad secured to one surface of said pouch, said first pad and said one surface of said pouch having a contiguous venting slot extending therethrough which opens when gases in said pouch distort the surfaces of said first pad and said pouch,

said venting means for said pouch further comprises a second slotted flexible, substantially flat surfaced pad, laminated to said first pad, said first and second pads and said one surface of said pouch having their slots in alignment forming a contiguous venting slot extending through said pouch.

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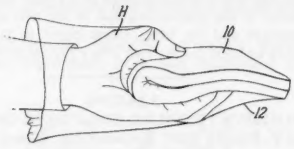
**3,865,110**

## DIAPER AND INTEGRAL EVERSION CONTAINER

**Robert F. Traverse, 42 Dickens St., Dorchester, Mass. 02125**

**Filed Aug. 14, 1973, Ser. No. 388,210**
**Int. Cl. A61f** *13/16*
**U.S. Cl. 128—284** **1 Claim**

**1.** A damp resistant diaper ensemble in the configuration of a flat elongated rectangle, said ensemble having a means for manual eversion of a bag to enclose a used damp diaper comprising a diaper having on one half length, at least one adhesive means across the width thereof, a water resistant bag of sheet material of a size substantially coextensive of the diaper and having an opening in a first end portion and attached on the outside surface adjacent its second end portion to said diaper adhesive means, said outside surface of said bag adjacent its opening and the diaper second half being joined by an adhesive tack means to define a disengageable attachment means between the bag and diaper whereby said bag opening defines a hand insertion means so said diaper second half




portion may be readily detached from the bag, folded over the remaining first portion to cover the soiled surfaces, and be enclosed in the bag by said manual eversion thereof.

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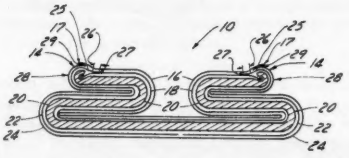
**3,865,111**

## EASILY DISPOSABLE DIAPER WITH SEALING BEAD

**William Victor Hayes Brooks, Toronto, Canada, assignor to Domtar Limited, Montreal, Canada**

**Filed Mar. 29, 1974, Ser. No. 455,996**
**Claims priority, application Canada, Apr. 9, 1973, 168,237**
**Int. Cl. A61f** *13/16*
**U.S. Cl. 128—287** **6 Claims**




**1.** A diaper comprising a porous hydrophobic facing layer, an impervious backing layer, an absorbent pad sandwiched between said facing and said backing layers, said pad being substantially the same width as said backing layer, a means for providing a moisture seal comprising a pleat extending outwardly toward each side of said diaper and terminating in a folded edge portion at the lateral extremities of the pad formed by a portion of said pad and said backing sheet folded over into a reverse fold in an inward direction and providing a raised sealing bead along each side edge of the diaper.

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**3,865,112**

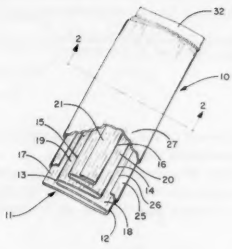
## SMALL SIZE SANITARY NAPKINS WITH IMPROVED ABSORPTION CAPABILITY

**Robert J. Roeder, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Mar. 5, 1974, Ser. No. 448,400**
**Int. Cl. A61f** *13/20, 13/18*
**U.S. Cl. 128—290 R** **5 Claims**

**1.** In a small size sanitary napkin comprising an elongate multilayered absorbent element enclosed in a fluid-pervious wrapper and having a fluid-impervious film disposed between the bottom of the element and the enclosing wrapper, the improvement wherein said multilayered element is comprised of a unitary stratified web, said stratified web being arranged in a multiplicity of layers, said layers being formed by longitudinally extending folds in said stratified web with said folds alternating from one side to the other in zig-zag sequence, the width of the lowermost of said layers defining the full width of said element with each succeeding layer disposed above said lowermost layer being narrower and having successively less surface area than the adjacent layer directly therebeneath,

said stratified web comprising multiple plies of creped absorbent cellulose tissue in which the ridges and valleys of the



crepe in the tissue plies run in the longitudinal direction of said element.

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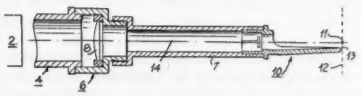
**3,865,113**

**LASER DEVICE PARTICULARLY USEFUL AS SURGICAL SCALPEL**

**Uzi Sharon, Tel-Aviv, and Isaac Kaplan, Savyon, both of Israel, assignors to Laser Industries Ltd., Tel-Aviv, Israel**

**Filed Dec. 4, 1972, Ser. No. 311,776**
**Claims priority, application Israel, Oct. 17, 1972, 40602**
**Int. Cl. A61b** *17/36*
**U.S. Cl. 128—303.1** **28 Claims**



1. A laser beam manipulator device that indicates the point of focus of a focused laser beam comprising:
- a tube connectable at one end to a manipulatable laser beam conduit through which the laser beam passes;
- a beam targeting member carried by the tube at its opposite end;
- said beam targeting member having a tip that is approximately the same distance along the longitudinal axis of the tube as the focal point of the laser beam; and
- means for permitting the viewing of the area around the focal point while the laser beam manipulator device is being maneuvered by an operator.

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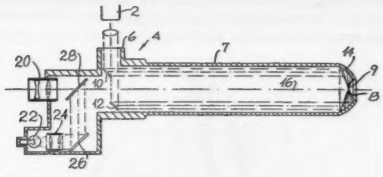
**3,865,114**

**LASER DEVICE PARTICULARLY USEFUL AS A SURGICAL INSTRUMENT**

**Uzi Sharon, Tel-Aviv, Israel, assignor to Laser Industries, Ltd., Tel-Aviv, Israel**

**Filed Oct. 11, 1973, Ser. No. 405,498**
**Claims priority, application Israel, Oct. 11, 1972, 40544**
**Int. Cl. A61b** *17/36*
**U.S. Cl. 128—303.1** **10 Claims**

1. A laser beam manipulator device comprising:
- an enclosure;
- an opening in said enclosure defining therein a working area in which may be received an object to be treated;
- means for receiving the laser beam within said enclosure and for conducting it to said opening; and
- means for intercepting the laser beam adjacent the opening,



whereby the beam is prevented from emerging through the opening in the enclosure.

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**3,865,115**

**COMBINED FEEDING AND TEETHING DEVICE FOR INFANTS**

**Peter De Mieri, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.**

**Filed Aug. 14, 1973, Ser. No. 388,129**
**Int. Cl. A61j** *17/00*
**U.S. Cl. 128—359** **1 Claim**

1. A device for use both in feeding an infant and assisting teething thereof, said device comprising:
- an elongated handle formed of stainless steel with one thereof formed into a head of a spoon;
- a teething ring formed of a firm yet yieldable non-metallic material which cannot cause injury to mouth, gum or teeth during teething, said ring being oriented in a plane essentially parallel to the plane containing the face of the spoon; and
- a plastic to metal seal disposed between the other end of the handle and the ring to secure the ring to the other end of the handle, the seal being flush with the surfaces of handle and ring.

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**3,865,116**

**METHOD OF CONTROLLING TISSUE HYPOTHERMIA**

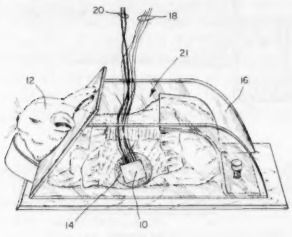
**Harold W. Brooks, R.D. 4, Danville, Pa. 17821**

**Filed Apr. 9, 1973, Ser. No. 349,442**
**Int. Cl. A61f** *7/00*
**U.S. Cl. 128—400** **4 Claims**

1. A method of cooling a pedicle flap or graft in situ comprising:
- forming a thermal transmission medium having one surface of substantially the same size, shape and outline as the pedicle flap or graft to be cooled;
- placing said one surface of said thermal transmission medium in substantial contact with the entirety of the pedicle flap or graft;

holding the cooling face of a thermoelectric device in contact with an exposed surface of the thermal transmission medium;

maintaining a temperature sensing device in position between the pedicle flap or graft and said one surface of said thermal transmission medium; and




thermostatically controlling the temperature of the cooling face of the thermoelectric device between the pedicle flap or graft and said thermal transmission medium so as to maintain the temperature of a substantial portion of the pedicle flap or graft at 15°–20° C.

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**3,865,117**

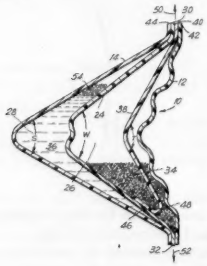
**THERMAL COMPRESS AND METHOD AND APPARATUS FOR MAKING THE SAME**

**Thomas William Perry, III, Brick Town, N.J., assignor to Micro Bio-Medics Inc., Mamaroneck, N.Y.**

**Filed June 25, 1973, Ser. No. 373,436**

**Int. Cl. A61f 7/04**

**U.S. Cl. 128—403** **18 Claims**




1. A thermal compress comprising an outer container defining an inner space, an inner wall within said container dividing said space into two separate compartments each bounded in part by said outer container, control means physically associated with said wall to provide, on the application of at least one manual force to the container, a passage through said wall at a localized and predictable position, and first and second means respectively located in said compartments and separated by said wall until the formation of said passage, said first and second means upon contacting one another, after the formation of said passage, performing a thermal function.

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**3,865,118**

**TRANSVENOUS COAXIAL CATHETER**

**Alan R. Bures, Irvine, Calif., assignor to The Regents of The University of California, Berkeley, Calif.**

**Filed Dec. 27, 1973, Ser. No. 428,966**

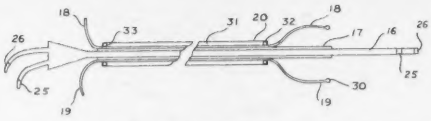
**Int. Cl. A61n 1/04**

**U.S. Cl. 128—404** **7 Claims**

7. An elongate pacing electrode catheter system capable of pacing both the atrium and the ventricle comprising:

an elongate flexible electrode extending the length of the catheter system for stimulating the ventricle, said electrode for stimulating the ventricle including a distal tip arranged to be moved into stimulating contact with the wall of a ventricle,

an elongate atrial electrode system, said atrial electrode system comprised of at least one energy conducting element mounted about a central portion of the ventricle




electrode rearward of the distal tip thereof, said elements including stimulation distal tip means,

there being means arranged to reciprocally move said atrial electrode system stimulating distal tip means from a first substantially coaxial position to an extended operative position.

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**3,865,119**

**HEARTBEAT ACTUATOR WITH CONTROLLED PULSE AMPLITUDE**

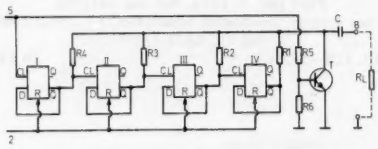
**Bengt Svensson, Ronninge, and Gunnar Wallin, Sollentuna, both of Sweden, assignors to Siemens Aktiengesellschaft, Erlangen, Germany**

**Filed Apr. 10, 1973, Ser. No. 349,809**

**Claims priority, application Germany, Apr. 11, 1972, 2217400**

**Int. Cl. A61n 1/36**

**U.S. Cl. 128—419 P** **1 Claim**




1. A heartbeat actuator, particularly an implantable heartbeat actuator, comprising a condenser, a charging circuit connected with said condenser for controlling pulse amplitude, means producing stimulating impulses, said charging circuit including a digital counter actuated by the pulses and a plurality of resistances connected thereto, whereby the counter combines the resistances to control pulse amplitude, said resistances having values arranged according to a geometrical row, means combining said resistances with each other, and means connected with said condenser and said impulse-producing means for applying the generated impulses to the heart, the combined resistances being switched into said charging circuit by said counter so that the lowering of the amplitudes takes place in predetermined equal steps.

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**3,865,120**

**PROCESS FOR PRODUCING TOBACCO FOILS**

**Ernst-Rolf Detert, Lubbecke, Westphalia and Willi Buchholz, Lubbecke, both of Germany, assignors to Edward Gerlach G.m.b.H, Westphalia, Germany**

**Filed Nov. 4, 1971, Ser. No. 195,585**

**Claims priority, application Germany, Nov. 12, 1970, 2055672**

**Int. Cl. A24b 03/14**

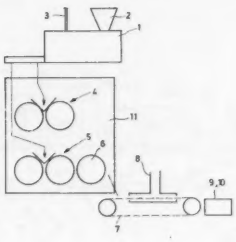
**U.S. Cl. 131—140 C** **7 Claims**

1. A process for the production of tobacco foils from tobacco, binders and solvents which comprises the steps of:

a. mixing tobacco particles in a size range of 0 to 10 mm with a solvent soluble, finely ground, cellulose derivative, in particle form selected from the group consisting of methyl cellulose, methylpropyl cellulose, acetyl cellulose and ethyl cellulose, and having a particle size of 0 to 0.2

mm to provide tobacco particles having cellulose particles loosely deposited therein but not completely covering the surface of the tobacco particles;

b. moistening the so mixed tobacco particles containing said loosely deposited cellulose particles with an organic solvent in an amount to insure superficial swelling of said cellulose and conversion of said cellulose into a jelly-like



state to provide a moist, solvent containing brittle tobacco granulate without wetting the tobacco mass and forming a pulp;

c. pressing the brittle solvent containing granulate into a tobacco foil; and

d. removing, by devolatilization, said organic solvent from said foil.

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**3,865,121**

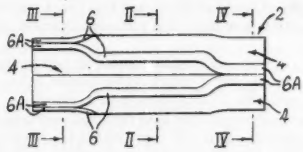
**CIGARETTE FILTERS**

**Desmond Walter Molins, London, England; Francis Auguste Maurice Labbe, Neuilly-sur-Seine, France, and Clive Perkins, London, England, assignors to Molins Limited, London, England**

**Division of Ser. No. 195,177, Nov. 3, 1971, Pat. No. 3,735,672. This application Feb. 15, 1973, Ser. No. 332,830**

**Int. Cl. A24d** *1/04*; **A24f** *7/04*

**U.S. Cl. 131—261 B** **6 Claims**



1. A cross-flow filter element comprising an elongated body constructed of a single web of filter material forming a tube having a plurality of spaced portions thereof folded towards a common location such that each of said inwardly folded portions contacts the adjacent inwardly folded portions at said common location forming an axially disposed core and each portion of said tubular filter material intermediate of said folded portions folded against itself forming a longitudinally extending laminated rib comprising contiguous parts of said intermediate portion; the plurality of longitudinally extending ribs extending radialy from said core and defining grooves therebetween; each rib having a central portion intermediate end portions at the opposite ends of the body, the free longitudinal edge of said central portion being spaced from and substantially parallel to the free edge of adjacent ribs and said two end portions being laterally displaced in opposite directions from the central portion with the adjacent end portions of adjacent ribs in sealing engagement in an alternating sequence, whereby alternate grooves between said ribs are closed at opposite ends of the body.

**3,865,122**

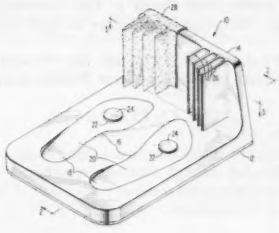
**FOOT DRYING APPARATUS**

**Everett E. Dabbs, 2617 Velma Burns Ct., Tucker, Ga. 30084**

**Filed Jan. 24, 1974, Ser. No. 436,362**

**Int. Cl. A49d** *29/00*

**U.S. Cl. 132—73** **11 Claims**



1. A foot drying apparatus, comprising:

a base for receiving a person's feet thereon;

an upstanding wall connected to one end of said base, said wall having a plurality of upstanding, laterally spaced ribs which extend inwardly over said base and are adapted to receive a person's toes therebetween; and

a water absorbing cover removably received on said wall and extending over said ribs to effect drying of the areas between the toes positioned between siad ribs.

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**3,865,123**

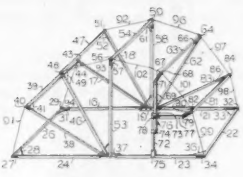
**PORTABLE TENT**

**Lee H. Bracken, 2153 Fieger St., San Diego, Calif. 92105**

**Filed Dec. 3, 1973, Ser. No. 421,277**

**Int. Cl. A45f** *1/16*

**U.S. Cl. 135—4 R** **5 Claims**



1. A portable tent comprising:

a frame having a plurality of structural units substantially equal in length;

a rectangular base consisting of six of said structural units having first and second short sides of one structural unit each and first and second long sides of two structural units each;

first, second, third and fourth hinge means coupling said long sides to said short sides;

fifth and sixth hinge means coupling the first and second structural units on said first and second long sides together, respectively;

a plurality of U-shaped structural units, each of said U-shaped structural units consisting of first, second and third structural units, all of said first, second and third structural units in said U-shaped structural units being hingedly attached to each other, the ends of said U-shaped structural units being hingedly coupled to said fifth and sixth hinge means, a central one of said plurality of U-shaped units being in perpendicular relationship with said rectangular base; and

another U-shaped unit having a structural unit with one end hingedly coupled to one of said first and second long side structural units in a central portion thereof, said struc-

tural unit being in parallel relationship with said central one of said plurality of U-shaped units for forming an entrance space.

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**3,865,124**
**FRICTION REDUCTION**

**Jacques R. Kohler, and Gerrit J. Van Amerongen, both of Amsterdam, Netherlands, assignors to Shell Oil Co., Houston, Tex.**

**Filed June 14, 1974, Ser. No. 479,400**
**Claims priority, application Great Britain, June 18, 1973, 28860/73**
**Int. Cl. F17d** *1/16*
**U.S. Cl. 137—13** **10 Claims**

**1.** A hydrocarbon composition having reduced frictional drag when flowing through pipelines or other conduits comprising a hydrocarbon and a minor proportion of a polymer or copolymer of cyclopentene.

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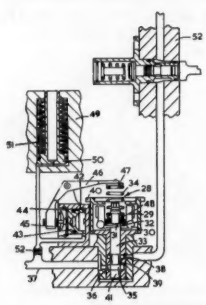
**3,865,125**
**GOVERNOR**

**Keith Gomersal, and Brian Padgett, both of Yorkshire, England, assignors to Rotax Limited, Birmingham, England**

**Continuation of Ser. No. 275,882, July 27, 1972, abandoned. This application Apr. 4, 1974, Ser. No. 457,976**
**Claims priority, application Great Britain, July 27, 1971, 35324/71**
**Int. Cl. G05d** *13/30*
**U.S. Cl. 137—51** **1 Claim**

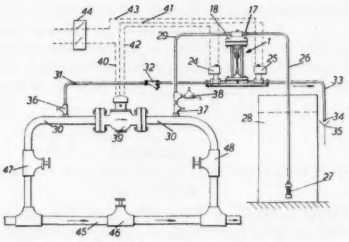


**1.** A governor comprising: a plurality of rotatable weights; a governor axis about which the weights are mounted for pivotal movement under the influence of centrifugal force; a piston valve connected to the weights, the piston valve being movable axially by said weights; resilient means, one end of which acts on one end of said piston valve to oppose axial movement thereof; a fluid inlet of the governor; a fluid outlet of the governor; said piston valve being interposed between said inlet and said outlet to define means for controlling fluid flow therethrough; a piston means and cylinder assembly, said cylinder having said outlet connected thereto, said piston means of said assembly being connected to act on the other end of said resilient means such that axial movement of said piston means results in a substantially uniform variation in the datum position of said one end of said resilient means; and a restrictor and a hydraulic accumulator connected in passage means between said governor outlet and said one end of said cylinder of said assembly.

**3,865,126**
**LIQUID METERING APPARATUS**

**Thomas H. Baggaley, 34 Rothschild St., London S.E. 27, England**

**Filed Nov. 26, 1973, Ser. No. 418,985**
**Claims priority, application Great Britain, Dec. 7, 1972, 56433/72**
**Int. Cl. G05d** *11/00*
**U.S. Cl. 137—101.21** **5 Claims**



**1.** A system for supplying a liquid additive to a flow of liquid under pressure, such system comprising:

**1.** a pipe for carrying the flow of liquid under pressure;

**2.** a diaphragm pump including a first diaphragm having first and second faces, a pumping chamber bounded partly by said first face of said first diaphragm, a primary operating chamber bounded partly by said second face of said first diaphragm, a second diaphragm having first and second faces, a secondary operating chamber bounded partly by said first face of said second diaphragm, means for subjecting said second face of said second diaphragm to ambient pressure, and means connecting said first and said second diaphragms for movement thereof in unison;

**3.** means for communicating said pumping chamber with a supply of liquid additive, and first check valve means for preventing flow from said pumping chamber to said supply;

**4.** means communicating said pipe and said pumping chamber, and second a check valve means preventing flow from said pipe to said pumping chambers;

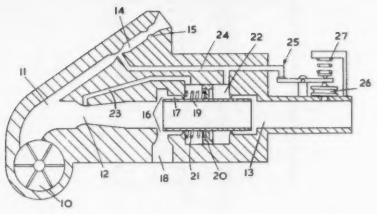
**5.** means communicating said first and said second operating chambers with said pipe, means for venting said first and said second operating chambers, solenoid valve means for controlling said pipe communicating means and said venting means of said first and second operating chambers, and a control device for operating said solenoid valve means cyclically whereby liquid under pressure is admitted from said pipe to said first and said second operating chambers when said venting means is closed and when said second face of said second diaphragm is subjected to ambient pressure, the force exerted on the said second diaphragm by said liquid under pressure in said second operating chamber combined with the force exerted on said first diaphragm by said liquid under pressure in said first operating chamber causing said diaphragms to move to pump additive in said pumping chamber into said pipe against the pressure of the liquid in said pipe, and means communicating said pipe to said first and said second operating chambers is then closed and said venting means opened to allow fresh additive to fill said pumping chamber;

**6.** and means for causing said diaphragms to move when said venting means opens whereby fresh additive is drawn into said pumping chamber.

## 3,865,127
## PRESSURE CONTROL ARRANGEMENTS FOR AIR COMPRESSORS

Geoffrey Arthur Lewis, Solihull, England, assignor to Lucas Aerospace Limited, Birmingham, England

Filed Jan. 29, 1973, Ser. No. 327,771
Claims priority, application Great Britain, Jan. 29, 1972, 4312/72
Int. Cl. G05d *11/00*; F16k *17/22*
U.S. Cl. 137—115 8 Claims




1. An apparatus for controlling the pressure of compressed air delivered from a compressor outlet to external apparatus, comprising in combustion first and second venturi means including inlets connected in parallel with an air compressor outlet; first passage means operatively connected to said first venturi means through which compressed air flows from said first venturi means to the external apparatus; second passage means operatively connected to said second venturi means for supplying a substantially constant source of low pressure control air;

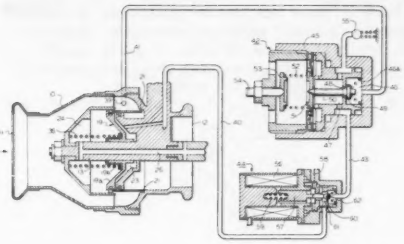
dump valve means operatively connected in said first passage means downstream of said first venturi means for spilling air from the first passage means to the atmosphere, said dump valve means including pressure-responsive actuating means having operating portions respectively operatively connected to and subject to opposed pressures from first and second venturi throat means and disposed downstream of the first venturi means and movable in opposite directions for controlling the amount of air spilled to the atmosphere and delivered to the external apparatus being controlled, and pressure modifying means operatively connected to said first passage means downstream of said dump valve means and including an operating portion subject to pressure in said first passage means and including means operatively connected to said second passage means for reducing the control pressure in said second passage means in response to excessive pressure in said first passage means.

## 3,865,128
## PRESSURE REGULATING AND SHUT-OFF VALVE

Vijay K. Zadoo, 1240 N. Wheeling Rd., Mt. Prospect, Ill. 60070

Continuation of Ser. No. 287,229, Sept. 8, 1972, abandoned.
This application Oct. 15, 1973, Ser. No. 406,597
Int. Cl. F16k *31/363*, *31/42*
U.S. Cl. 137—220 1 Claim

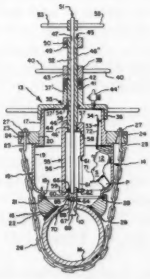
1. An inline pressure regulating and shutoff valve comprising a tubular casing having an inlet and an outlet coaligned therewith, an axially extending rod supported within said casing, a first end wall on said rod adjacent the inlet and a second end wall on said rod adjacent the outlet, an annular valve seat at the outlet, a cylindrical skirt extending from the first end wall toward the valve seat defining an annular passageway with the casing and an annular opening with said valve seat, a piston slidable on said rod and in peripheral sealing engagement with said skirt, a valve sleeve extending from said piston and movable between open and closed positions with respect to said opening and valve seat, means sealing said second end wall with said valve sleeve, said sealing means including an annular groove in the periphery of the end wall, and a seal assembly in said groove having a contracting ring engaging the bottom of the groove sandwiched between a pair of expanding rings engaging said valve sleeve, said contracting and expanding rings being constructed to perform independent radial contracting and expanding functions due to their own natural bias, return spring means continually biasing said piston and sleeve towards closed position, said piston defining a first chamber with said first end wall and said skirt and a second chamber with said second end wall and said sleeve, means continually venting said first chamber to the pressure at the outlet, a pressure regulator having an inlet connected to the inlet pressure ahead of the valve seat and an outlet, and a control valve selectively connecting said second chamber to either the outlet of the pressure regulator or atmosphere, wherein the sleeve moves to closed position when the second chamber is connected to atmosphere and modulates its position to regulate flow through said opening in response to the inlet pressure when the second chamber is connected to the pressure regulator to maintain a constant outlet pressure.



## 3,865,129
## APPARATUS FOR MOVING A PLUG FITTING

Ralph L. Peterson, 27 Woodward Dr., West Seneca, N.Y. 14224

Division of Ser. No. 293,763, Oct. 2, 1972, Pat. No. 3,822,718.
This application Mar. 4, 1974, Ser. No. 447,723
Int. Cl. B23b *41/08*; F16e *41/04*
U.S. Cl. 137—315 7 Claims



1. In apparatus for moving a plug fitting relative to a hole in a conduit, the combination comprising:

a housing mountable on said conduit over a fitting arranged in and to be removed from said hole;

support means movably mounted on said housing and including an inner portion arranged within said housing for movement toward and away from said fitting;

interlock means carried by said inner portion and arranged for selective interlocking engagement with said fitting; and

force means operatively interposed between said housing and support means for withdrawing said fitting from said hole.

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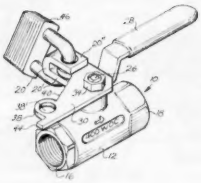
**3,865,130**
**LOCK VALVE**
**Jerry D. Mull's, Monroe, N.C., assignor to Consolidated Brass Company, Matthews, N.C.**
**Filed Dec. 26, 1973, Ser. No. 428,076**
**Int. Cl. F16k** *35/00*
**U.S. Cl. 137—385** **3 Claims**



**1.** A flow-control valve including a valve casing having a U-shaped locking post extending therefrom to present spaced leg portions having aligned openings formed therein, a valve member movable within said valve casing between selected first and second dispositions thereof, and a valve handle associated with said valve member for moving said valve member between said selected dispositions thereof, said valve handle including a locking plate portion formed with first and second locking projections each having an opening therein and a removal recess extending between said first and second projections, and said valve handle being mounted for selective shifting between a first position at which said valve member is at said first disposition thereof and one of said locking projections is disposed between said leg portions of said locking post with the opening in said one locking projection being aligned with said aligned openings in said locking post leg portions, a second position at which said valve member is at said second disposition thereof and the other of said locking projections is disposed between said leg portions of said locking post with the opening in said other locking projection being aligned with said aligned openings in said locking post leg portions, and a removal position, intermediate said first and second positions, at which said removal recess of said locking plate portion is disposed adjacent said locking post and beyond the extent of one of said leg portions thereof whereby said locking plate portion is clear of said U-shaped locking post to permit removal of said valve handle.

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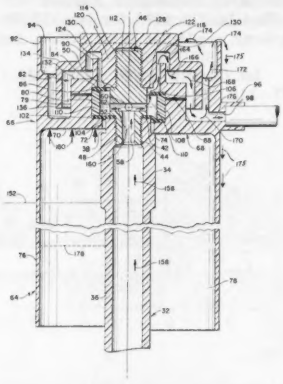
**3,865,131**
**VALVE ASSEMBLY WITH RECIPROCAL FLOAT UNIT**
**Edwin B. Jacobson, Wanamingo, Minn., assignor to Jacobson Valves, Inc., Wanamingo, Minn.**
**Filed Sept. 7, 1973, Ser. No. 395,075**
**Int. Cl. F16k** *31/24*
**U.S. Cl. 137—432** **18 Claims**

**1.** A valve assembly including vertical supply means having at least one outlet port and a downwardly facing shoulder at an elevation above said port, a float unit guided by said supply means forming a pressure chamber into which fluid flows which passes through said outlet port, a first flexible sealing member provided with a generally flat, annular configuration having its outer edge portion fastened to said float unit and its inner edge portion underlying said shoulder so that when said float unit moves sufficiently upwardly said inner edge portion engages said shoulder to prevent upward flow of fluid from said pressure chamber, a second flexible sealing member provided with a generally flat, annular configuration having its inner edge portion supported by said supply means at an elevation below said port and its outer edge supported by said



float unit to prevent downward flow of fluid from said pressure chamber.

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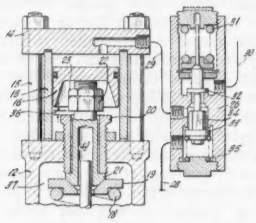
**3,865,132**
**PILOT OPERATED RELIEF VALVE**
**Charles W. Wiegand, 18 Circuit Rd., New Rochelle, N.Y. 10805**
**Filed Aug. 17, 1973, Ser. No. 389,139**
**Int. Cl. F16k** *17/02*
**U.S. Cl. 137—492.5** **4 Claims**



**1.** In a valve assembly adapted to relieve excess pressure from a pressure vessel, the assembly comprises a pressure relief valve, a pressure responsive means and a pilot valve,

whereas said relief valve is held in a closed position by a compression spring adapted to release pressure when a predetermined pressure is reached,

whereas said pressure responsive means comprises a cylinder closed on one end and a piston slidable therein, the open end of said cylinder is mounted on the top of said relief valve so that said piston can operatively engage the top end of said compression spring when said cylinder is supplied pressure from said vessel through a conduit to activate said piston which by having a larger area than the seat area of said relief valve will urge said compressior spring beyond its initial preset position thereby increasing the spring loading in said relief valve,

whereas said pilot valve being operable in response to pressure from said vessel and normally open to the flow of pressure from said vessel to said cylinder will activate said piston and at a predetermined pressure said pilot valve being positioned in said conduit will close the pressure to said cylinder and concurrently exhaust the pressure

therein whereas said piston being deactivated will recede in said cylinder by the returning of said compression spring to its initial preset position wherein said relief valve will open at its initial set pressure.

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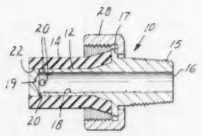
**3,865,133**
**SELF CLEANING CHECK VALVE**
**James W. Alford, South St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Oct. 31, 1973, Ser. No. 411,280**
**Int. Cl. F16k** *15/14*
**U.S. Cl. 137—512** **4 Claims**



**1.** A mixing chamber suitable for mixing a plurality of materials comprising:

a housing having a mixing chamber with inlets and an outlet; and

check valves securely mounted in said inlets, said valves comprising a valve stem projecting into said chamber and having a central bore terminating with a closed end wall, a discharge opening in said stem adjacent said end wall, an inlet end opposite said end wall and a flexible sleeve of elastomeric material covering said stem, one end of said sleeve covering said discharge opening and the other end of said sleeve, opposite said discharge opening, being firmly secured to said stem, said valves having axes which are in an angular relationship to each other whereby when material is pumped in said inlet end through said bore and out said discharge opening, said sleeve expands allowing material to flow into said mixing chamber where the materials impinge causing mixing and when no material is being pumped through said bore, said sleeve contracts covering said discharge opening and preventing material from said mixing chamber from entering said discharge opening.

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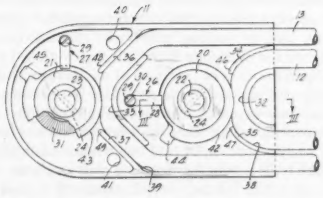
**3,865,134**
**SANITARY VALVE**
**Donald E. Holcomb, Brooklyn Center, Minn., assignor to The Cornelius Company, Golden Valley, Minn.**
**Filed Apr. 23, 1973, Ser. No. 353,770**
**Int. Cl. F16k** *7/06*
**U.S. Cl. 137—594** **6 Claims**



**1.** A sanitary control valve assembly comprising:

a. a housing having a pair of internal spaced reaction surfaces directed in the same direction;

b. a pair of radially resilient tubes each arranged in a U-shape and respectively arranged about said reaction surfaces, the one U-shape being disposed about the other U-shape; and

c. a pair of manually rotatable cams carried by said housing, and each having a camming surface respectively coactive with one of said reaction surface for individually collapsing said tubes by a selected amount.

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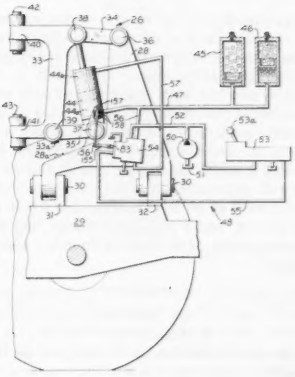
**3,865,135**
**HYDRAULIC CONTROL VALVE FOR FLUID SUSPENSION SYSTEM**
**Orcenith D. McWilliams, Morris, and Roger A. Rice, Joliet, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**
**Division of Ser. No. 286,025, Sept. 5, 1972, Pat. No. 3,797,140. This application Oct. 9, 1973, Ser. No. 404,309**
**Int. Cl. B60d** *1/00;* **F16k** *11/00*
**U.S. Cl. 137—596.14** **9 Claims**



**1.** A hydraulic control valve comprising;

a valve body having an inlet port, first and second outlet ports and a return port;

means forming a first passage in said body for communicating said inlet port with said first outlet port and said return port;

a first valve element movably disposed in said valve body in said first passage for selectively and alternately communicating said inlet port with said first outlet port or said return port;

means forming a second passage in the body interconnecting said first and second outlet ports;

a second valve element movably disposed in said valve body in said second passage for selectively controlling communication between said first and second outlet ports;

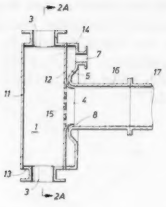
means forming a third passage in said body interconnecting said second outlet port and said return port; and

a third valve element movably disposed in said valve body in said third passage for selectively controlling communication of said second outlet port with said return port and operative to provide such communication when communication between said outlet ports is blocked by said second valve element.

## 3,865,136
## OIL/WATER PIPELINE INLET WITH OIL SUPPLY VIA A LARGE CHAMBER

**Eke Verschuur, 3 Badhuisweg, Amsterdam, Netherlands**

**Division of Ser. No. 217,486, Jan. 13, 1972, Pat. No. 3,822,721. This application Apr. 22, 1974, Ser. No. 463,007**
**Claims priority, application Netherlands, Apr. 29, 1971, 7105971**
**Int. Cl. F17d *1/16***
**U.S. Cl. 137—604** **1 Claim**

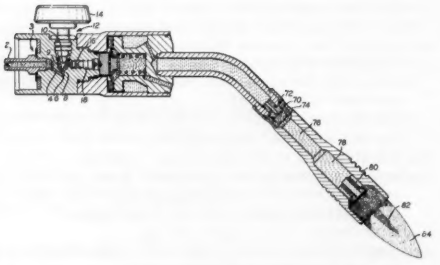


**1.** Apparatus for transporting a viscous oil through a pipeline by the introduction of a surrounding annular layer of water about the oil without the occurrence of oil drop formation within the water layer, comprising, a first chamber bounded by two flat walls and a curved wall having two opposed oil inlets, one of the flat walls having a circular exit for the oil with a perforated plate located therein, a second chamber next to the first chamber which is bounded on one side by the flat wall in which there is the oil exit and on the other side another wall, the second chamber being provided with a water inlet and having an annular water outlet which surrounds the circular oil exit, and a cylindrical connecting piece attached to the water outlet of the second chamber and connected to the pipeline.

## 3,865,137
## REGULATOR VALVE

**Milos Chvatal, Rochester, N.Y., assignor to Bernz-O-Matic Corporation, Rochester, N.Y.**

**Filed May 26, 1972, Ser. No. 257,363**
**Int. Cl. F16k *31/365***
**U.S. Cl. 137—613** **11 Claims**

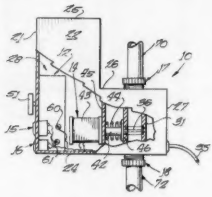


**1.** Gas regulator valve comprising elongated housing means containing a gas inlet, a gas passageway therethrough and a gas outlet, and in said passageway in axial alignment with the housing means, tire valve means and pressure regulating means, flow regulating means between the gas inlet and the tire valve means, said pressure regulating means including flexible diaphragm means secured to the walls of the housing and biased against the tire valve means by spring means contained in a bore located in said housing, said bore being axially aligned with said housing, said gas inlet, said gas outlet, and said tire valve means, said bore having an air inlet communicating with the atmosphere, said pressure regulating means and said housing defining a portion of the gas passageway which diverges from the axis of said bore upstream thereof, said housing defining the next portion of the gas passageway which communicates with the gas outlet and which is annularly positioned about said bore.

## 3,865,138
## AUTOMATIC SPRINKLER CONTROL DEVICE

**Wayne D. Jones, 16 Aurora Dr., Cheektowaga, N.Y. 14215**

**Filed May 15, 1974, Ser. No. 470,145**
**Int. Cl. A01g *27/00*; F16r *35/06***
**U.S. Cl. 137—624.12** **5 Claims**



**1.** An automatic sprinkler control device intended for use with a conventional outdoor water faucet for controlling the flow of water therefrom to an apparatus being controlled thereby, the device comprising:

a housing having a compartment defined interiorly thereof; an inlet port extending exteriorly of the housing;

a outlet port extending exteriorly of the housing;

a conduit disposed in said compartment and interconnecting said inlet port and said outlet port;

a rigid tubular connector having one end adapted to be affixed to said inlet port and having the other end thereof adapted to be affixed to the outlet of a conventional outdoor mounted water faucet, said connector rigidly supporting said housing relative to said outdoor faucet;

electrically operated solenoid control valve interposed in said conduit and operable between an open position to permit water to flow therethrough and a closed position blocking said conduit to prevent water flow therethrough; an electric motor operated timer mechanism mounted in said compartment and including an electric motor and a timer operated switch associated therewith, a shaft projecting from said timer mechanism to a position exteriorly of said housing and adapted for operation to set a time at which said switch will be moved to a closed position to energize said solenoid and when said switch will be moved to an open position to de-energize said solenoid; suitable electrical wiring means interconnecting said timer operated switch to said solenoid valve means;

suitable electric wiring means adapted to connect said solenoid coil and said timer mechanism and said timer operated switch to a suitable source of electrical power, said means projecting exteriorly of said housing;

a key operated electric kill switch mounted in said compartment and projecting exteriorly of said housing and adapted for operation from a normally closed position to an open position by insertion of an operating key through the projecting portion thereof, said kill switch electrically interposed in series relationship intermediate said timer mechanism switch and said solenoid coil to provide manual de-energization of said coil when said timer operated switch is in a closed energizing position; and

a key operated selector switch mounted in said compartment and projecting exteriorly thereof and which is of a normally open switch construction and which is electrically interposed in series relationship with said solenoid coil means and operable between an inoperative open position and an operative closed position to energize said coil means, said selector switch being disposed in electri-

cal parallel relationship with said series connected timer operated switch and key operated kill switch.

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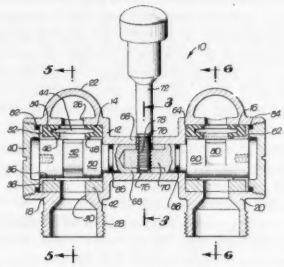
**3,865,139**

## APPLIANCE SHUTOFF VALVE

**Julius L. Tolnai, Los Angeles, Calif., assignor to Price Pfister Brass Mfg. Co., Pacoima, Calif.**

**Filed Aug. 24, 1973, Ser. No. 391,238**
**Int. Cl. F16k** *5/04*
**U.S. Cl. 137—625.19** **2 Claims**



**1.** In a shutoff valve for an appliance utilizing hot and cold water hoses:

a. a valve body having outwardly facing cups located in axial alignment, and a hollow connecting portion therebetween;

b. means forming diametrically disposed inlet and outlet ports to each cup;

c. a hollow cage in each cup;

d. a sealing member mounted peripherally of each cage, each sealing member having an outer wall and an inner wall, forming a pressure chamber therebetween communicating with the corresponding inlet, said inner wall having a bead projecting into an opening of the cage to be exposed at the hollow interior of said cage;

e. a pair of spools fitting the cages respectively, and having inner ends fitted to each other and to a handle projecting radially of the common axis of the spools, said spools having arcuately extending channels opposed to said beads, said spools also having surfaces beyond the ends of said channels for engagement by said beads for sealing of said chambers from said outlets;

f. said channels of said spools being so arrayed relative to said beads that the angular position of said handle determines the flow characteristics of hot and cold water to said appliance.

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**3,865,140**

## SOLENOID-OPERATED, THREE-WAY FUEL VALVE WITH PRESSURE BALANCING

**Roger Greenwood, Northridge, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Aug. 22, 1973, Ser. No. 390,484**
**Int. Cl. F15b** *13/044*
**U.S. Cl. 137—625.64** **9 Claims**

**1.** A three-way, normally closed fluid valve comprising:

a valve body having first and second chambers therein and a communicating third chamber joining said first and second chambers;

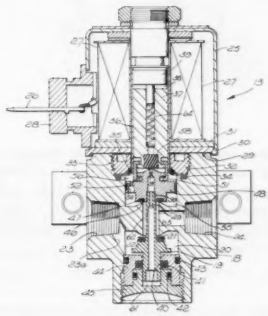
an inlet port including a duct for applying fluid under pressure to said first chamber;

an outlet port for applying said fluid under pressure from said third chamber to a utilization device when said valve is in the open condition, said fluid having passed from said first chamber through said third chamber;

first means including a piston mounted with axial sliding freedom within said first chamber, and a poppet assembly mounted with axial sliding freedom within said second chamber, said first means including a hollow stem having an axial bore, said stem extending axially through said third chamber to mechanically join said piston and said poppet assembly, said bore extending axially through said stem, said poppet and said piston;

a fourth chamber at a second end of said poppet assembly opposite said stem forming a closed cylinder into which said poppet assembly second end may slide, said bore being open to said fourth chamber;

second means operatively associated with said first means and including upper and lower valve orifices, said upper orifice being arranged to be positioned open and said lower orifice being arranged to be positioned closed when said first means is in an axially translated position corresponding to the open position of said three-way valve, said upper orifice being closed and said lower orifice being open when said first means is in an axially translated position corresponding to the closed position of said three-way valve;



third means comprising a bleed hole extending generally axially through said piston to permit fluid flow therethrough at a predetermined rate, thereby joining the portion of said first chamber on either side of said piston;

fourth means for applying a generally axial mechanical force to a first end of said piston of said first means opposite said stem to operate said valve;

fifth means comprising a third valving orifice at said first end of said first means, said fifth means being responsive to said fourth means for draining fluid pressure through said bore from the portion of said first chamber adjacent said piston first end to initiate opening of said three-way valve;

a drain-back port and duct for draining said second chamber externally when said valve is in said closed position; and

sixth means comprising an opening in the wall of said hollow stem within said third chamber, said hole permitting drainage of said bore and said fourth chamber into said third chamber and thereafter into said drain-back port when said three-way valve is in said closed condition.

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**3,865,141**

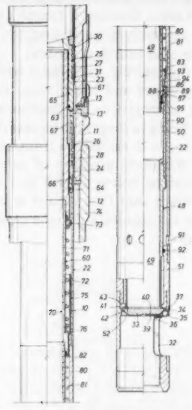
## SUBSURFACE SAFETY VALVE APPARATUS

**David E. Young, Friendswood, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Filed June 29, 1973, Ser. No. 374,859**
**Int. Cl. F16k** *31/16*
**U.S. Cl. 137—629** **19 Claims**

**1.** A safety valve apparatus comprising: a housing having a flow passage therethrough and valve means for opening and closing said flow passage; actuator means for moving said valve means from closed to open position; hydraulically operable means within said housing and movable relative to said actuator means and toward said valve means in response to

fluid pressure; fluid bypass passage means extending past said valve means and arranged when open to equalize pressures upstream and downstream of said valve means; equalizing valve means including coengageable means on said actuator means and said hydraulically operable means for opening said bypass passage in response to movement of said hydraulically



operable means relative to said actuator means; and spring means reacting between said hydraulically operable means and actuator means and being energized by said relative movement to cause said actuator means to move said valve means from closed to open position under conditions of substantially equalized pressures.

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**3,865,142**

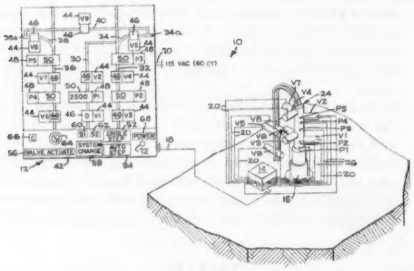
**ELECTRIC REMOTE CONTROL SYSTEM FOR UNDERWATER WELLS**

**Robert A. Begun, Los Gatos; Erik Thuse, Santa Clara, and Arthur L. McGee, both of San Jose, all of Calif., assignors to FMC Corporation, San Jose, Calif.**

**Continuation of Ser. No. 38,656, May 19, 1970, abandoned. This application Mar. 8, 1973, Ser. No. 339,236**

**Int. Cl. F16k** *31/44*

**U.S. Cl. 137—635** **8 Claims**



1. In a fluid well flow control apparatus having a system for remotely controlling the operation of electrically energized mechanisms wherein said mechanisms have a plurality of operational states, and for measuring and reading out the operational state of each of said mechanisms, said system including a control station connectable to a source of electrical power, electrical circuit means at said control station with display means having indicators for individually selectively indicating the operational state of said mechanisms, a switching station in the vicinity of the fluid well, first means including electric conductors for electrically interconnecting the control station and the switching station, and second means including electric conductors for individually electrically interconnecting the switching station with each of said electrically energized mechanisms, the improvement comprising:

a. said selective indication means having a corresponding selective response to each one of a plurality of differing predetermined voltages present in one of said electric conductors,

b. a plurality of resistors interconnected with said mechanisms for providing said differing predetermined voltages,

c. means for selectively interconnecting said resistors in response to control of said mechanisms to produce said predetermined voltages on said conductor, and wherein,

d. said plurality of resistors include first, second and third resistors, wherein said first and third resistors are selectively connected in parallel by said selective interconnecting means to provide a predetermined voltage indicating a first limit of operation of said mechanism, said second and third resistors are selectively connected in parallel by said selective interconnecting means to provide a differing predetermined voltage indicating a second limit of operation, and said third resistor alone provides a further differing predetermined voltage indicating a third state of operation when said first and second resistors are disconnected therefrom,

thereby to effect display at said control station of the particular operational state of the well control mechanisms with a minimum of conductors interconnecting said mechanisms and said control station.

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**3,865,143**

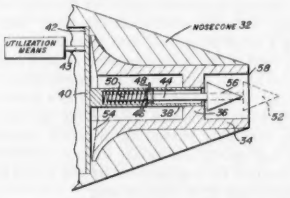
**FLUIDIC OSCILLATOR HAVING A STING MOUNTED IN A RESONANT CAVITY**

**Paul A. Curto, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 7, 1973, Ser. No. 423,044**

**Int. Cl. F15c** *3/00*; **H02k** *35/00*

**U.S. Cl. 137—826** **12 Claims**




1. A fluidic oscillator comprising:

a housing having a passageway through which fluid passes;

a resonant cavity formed in the housing and in communication with the passageway;

a diaphragm mounted in the cavity for responding to oscillating fluid pressure waves in the cavity;

a rod axially positioned in said passageway, said rod being wholly retracted within said passageway when said fluidic oscillator is inactive;

and means for extending one end of said rod outwardly beyond said housing, for triggering oscillating fluid pressure waves in said cavity, when said fluidic oscillator is active.

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**3,865,144**

**SPACER FOR DOUBLE WINDOWS**

**Josef Westhoff, Wickede, Germany, assignor to Standard Metallwerke GmbH, Werl, Germany**

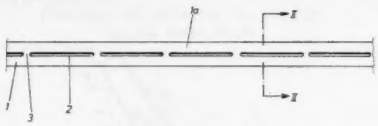
**Filed Jan. 31, 1973, Ser. No. 328,229**

**Int. Cl. F16l** *9/02*

**U.S. Cl. 138—103** **2 Claims**

1. A device for use as a spacer between two air-tightly connected glass panes of a double window, comprising: a pipe-like hollow section adapted to be filled with a drying medium, to be mounted between the glass panes and serving as the distance spacer therefor; one surface of said hollow

section comprising a substantially flat web having a plurality of slits formed therein which extend along an axis parallel to the longitudinal axis of said hollow section, and flap portions longitudinally oriented to said web, extending therefrom in-



wardly into the interior of said hollow section and having a longitudinal first cut free edge; wherein said web has a second cut free edge closely adjacent but opposite said first cut edge and complementary thereto; and said slits are defined and limited by said first and said second cut edges.

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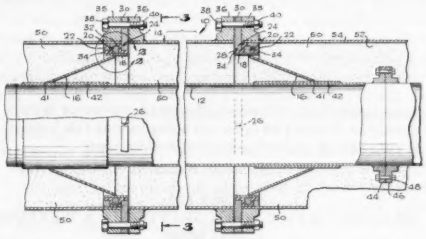
**3,865,145**

## PIPELINE SYSTEM

**Alexander R. McKay, and Daniel M. Masterson, both of Calgary, Alberta, Canada, assignors to Foundation Cryogenic Joint Venture, Vancouver, Canada**

**Filed May 10, 1973, Ser. No. 359,091**
**Int. Cl. F16l** *9/18*
**U.S. Cl. 138—113** **27 Claims**



**1.** A pipeline system having reduced contraction when subjected to low temperatures, comprising a first inner pipe means, a second outer pipe means disposed concentrically about said inner pipe means, and providing an annular space between said inner pipe means and said outer pipe means, a plurality of stress means disposed in said annular space, each said stress means being connected at one end portion to said inner pipe means and at the other end portion to said outer pipe means, said stress means securing said inner pipe means to said outer pipe means, and arranged to transfer a compressive load from one of said pipe means to a tension load on said other pipe means, said stress means also formed to provide thermal resistance to the flow of heat from one of said pipe means to the other of said pipe means, and thermal insulation means selectively positioned at at least one of the connections of each of said stress means between said inner and outer pipe means.

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**3,865,146**

## HELICALLY WOUND TUBING AND METHOD OF FORMING THE SAME

**Robert H. Meserole, Toledo, Ohio, assignor to Johns-Manville Corporation, Greenwood Village, Colo.**

**Filed Mar. 22, 1974, Ser. No. 453,621**
**Int. Cl. F16l** *9/16;* **B21c** *37/12*
**U.S. Cl. 138—154** **6 Claims**

**1.** In a method of forming a tube comprising spirally winding a metal strip, overlapping lateral edges of adjacent convolutions of the strip and locking together the lateral edges to form a locking seam, the improvement comprising:

a. forming a longitudinally extending channel in a first lateral edge of the strip, said channel having an outer wall and an inner wall extending at substantially right angles to the plane of the strip, and said inner wall being a first corrugation;

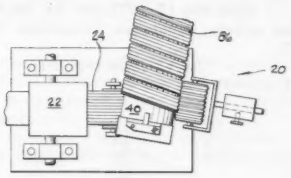
b. forming a longitudinally extending second corrugation and a flange in a second lateral edge of the strip, said second corrugation extending at substantially right angles to the plane of the strip and said flange extending outward from said second corrugation and generally parallel to the plane of the strip;

c. convoluting the strip and overlapping the lateral edges of adjacent convolutions with the flange being received within the channel and the outer wall of said channel being received within said second corrugation;

d. folding over one of said corrugations toward the other of said corrugations and upon the flange; and

e. folding over the other of said corrugations upon said one of said corrugations.

**3.** In a tube comprising a spirally wound metal strip wherein lateral edges of adjacent convolutions of the strip overlap and



are locked together by a seam, the improvement in the seam comprising

a. a first lateral edge of the strip forming a first element of said seam, said first lateral edge comprising a first fold which terminates at the first lateral edge of said strip, a second fold, a third fold and a fourth fold, said third and fourth folds forming a corrugation which is connected to said first fold by said second fold,

b. a second lateral edge of the strip forming a second element of said seam, said second lateral edge comprising a fifth fold which extends from sixth and seventh folds that form a second corrugation, and

c. said first fold being received within said second corrugation, said second and said fifth folds being adjacent seam folds, one of said corrugations being folded over upon said fifth fold and the other of said corrugations being folded over upon the one corrugation with all of said folds extending substantially parallel with respect to each other.

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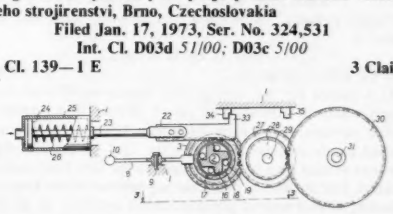
**3,865,147**

## MECHANISM FOR THE RETURN MOVEMENT OF HEALD SHAFTS OF A WEAVING LOOM

**Jaroslav Lev, and Karel Kakac, both of Brno, Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi, Brno, Czechoslovakia**

**Filed Jan. 17, 1973, Ser. No. 324,531**
**Int. Cl. D03d** *51/00;* **D03c** *5/00*
**U.S. Cl. 139—1 E** **3 Claims**



**1.** A mechanism for driving the heald shafts of a weaving loom in the rearward direction, which is the reverse of their weaving direction, in order to permit the removal of woven in weft-threads, the loom having heald shafts and means for driving the heald shafts in the forward weaving direction comprising a drive shaft rotatably supported on the frame of the weaving loom, said drive shaft freely slidably and rotatably

supporting a slidable gear and the means for driving the heald shafts, an over-running clutch having a driving and a driver part, and means for selectively connecting and disconnecting such driving and driver parts, second and third clutches for alternately coupling the gear with its supporting drive shaft and with the driving part of the over-running clutch, and means for selectively driving the driving part of the over running clutch in cycles in each of which the cam by which the heald shafts are turned is rotated in said rearward direction through an angle equalling the degree of turning of the cam of the heald shafts in the opposite direction in one cycle of the weaving operation of the loom.

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**3,865,148**

## JACQUARD MACHINE

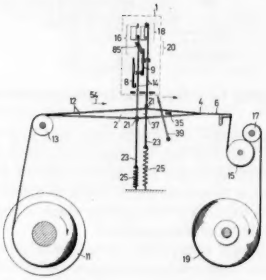
**Brenner Wolfgang; Feier Gunter, and Vinnemann Antonius, all of Stuttgart, Germany, assignors to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed May 17, 1973, Ser. No. 361,034**

**Claims priority, application Switzerland, May 19, 1972, 7466/72**

**Int. Cl. D03c** *3/00, 3/20*

**U.S. Cl. 139—59** **10 Claims**



1. In a jacquard machine having a lifting hook, a pair of draw knives disposed to move in predetermined paths, and means for selectively displacing said lifting hook into and out of coupling engagement with a respective draw knife; said displacing means including a pivotally mounted lever disposed in the path of each said knife and connected to said hook, and a selector mechanism for selectively blocking displacing movement of said hook.

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**3,865,149**

## DEVICE FOR STORING A THREAD PORTION

**Rachid Keldany, Egg/Zurich, Switzerland, assignor to Ruti Machinery Works, Ltd., Ruti/Zurich, Switzerland**

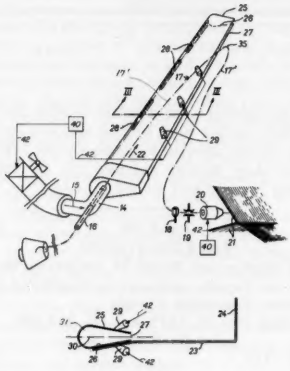
**Filed June 4, 1973, Ser. No. 366,317**

**Claims priority, application Switzerland, June 16, 1972, 9081/72**

**Int. Cl. D03d** *47/34*

**U.S. Cl. 139—122 R** **7 Claims**

1. A device for the storage of a thread portion of varying length which is subjected to an air stream that retains said thread portion in the form of a loop between a first and a second predetermined location, the end of one of the leg portions of said loop being adjacent to the first predetermined location and the end of the other leg portion of the loop being adjacent to said second predetermined location, an air injector means for continuous delivery of a thread from said first predetermined location to form said loop and means for periodic draw-off of the thread portion from said loop after said loop is formed, said draw-off taking place at said second predetermined location, from which the thread is inserted into a shed of a loom with the aid of weft thread inserter means, there being provided two elongate plates for guiding and shaping the air stream forming said loop, which plates are disposed opposite each other at their broad sides and form an elongated interspace therebetween in the longitudinal direction of which blow-in of the air stream supplied by the injector



means takes place and which elongated interspace is open to the outside, forming an open slot along its long side located on the side of said second predetermined location.

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**3,865,150**

## BRAKING DEVICE FOR A SHUTTLE IN A WEAVING MACHINE

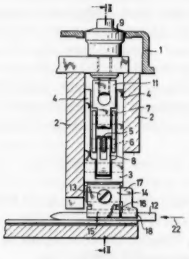
**Hans Demuth, Winterthur, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland**

**Filed June 4, 1973, Ser. No. 366,523**

**Claims priority, application Switzerland, June 20, 1972, 9241/72**

**Int. Cl. D03d** *49/54*

**U.S. Cl. 139—185** **6 Claims**



1. A braking device for braking a shuttle in a weaving machine comprising

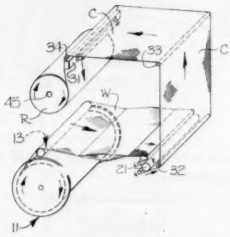
a brake member for reciprocally moving relative to a shuttle path; and

a one-piece brake shoe mounted on said brake member, said brake shoe including a braking surface for pressing against a shuttle and guide jaws disposed on opposite sides of said braking surface for guiding a shuttle therebetween.

## 3,865,151
## JUMBO CLOTH TAKE-UP AND INSPECTION APPARATUS FOR TEXTILE LOOM

**Emory Donald Poole, Fort Mill, S.C., assignor to Spring Mills, Inc., Fort Mill, S.C.**

**Filed Mar. 18, 1974, Ser. No. 451,739**
**Int. Cl. D03d** *49/20*
**U.S. Cl. 139—304** **10 Claims**



**1.** Jumbo cloth take-up and inspection apparatus for a textile loom having conventionally-mounted warp beam mechanisms at the rear of the loom and successively positioned weaving mechanisms terminating at generally the front of the loom and including drive means, said apparatus characterized by forming a larger-than-normal roll of woven cloth before doffing, providing on-the-loom cloth inspection, and maintaining the woven cloth generally above the conventional loom warp beam and weaving mechanisms to prevent the cloth from becoming dirty and improve quality, said apparatus comprising:

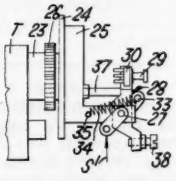
means for guiding the woven cloth from the front of the loom generally vertically upwardly to provide an inspection area for on-the-loom inspection of the woven cloth and then generally horizontally over the top of the loom toward the rear thereof; and

take-up roll means mounted generally above the warp beam mechanisms at the rear of the loom a sufficient distance to provide space for receiving the woven cloth from said guiding means and forming a larger-than-normal jumbo roll of woven cloth before doffing is necessary.

## 3,865,152
## AUTOMATIC COILS WINDING TURRET MACHINE

**Giuseppe Camardella, Viale della Liberta, 118, 20031 Cesano Maderno, Italy**

**Filed May 3, 1973, Ser. No. 356,792**
**Int. Cl. B21f** *3/04*
**U.S. Cl. 140—1** **12 Claims**

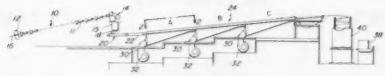


**1.** In a coil winding machine having a step-by-step rotating turret, and support means spaced about the periphery of the turret for coils to be wound in a coil winding station with subsequent cutting of the wire in a wire cutting station; the improvement in which said support means comprise gripping means that act laterally on the periphery of each coil core and expose both ends of the coil core, and means mounting said gripping means for vertical swinging movement between a position in which the axis of the coil core is horizontal and a position in which the axis of the coil core is vertical.

## 3,865,153
## METAL TREATMENT APPARATUS FOR STEEL ROD HAVING AN OSCILLATING PLATFORM BELOW THE LAYING HEAD

**Vito J. Vitelli, Auburn, Mass., assignor to Morgan Construction Company, Worcester, Mass.**

**Filed Dec. 3, 1973, Ser. No. 421,158**
**Int. Cl. B21f** *23/00*
**U.S. Cl. 140—2** **8 Claims**



**1.** An apparatus for depositing a continuous series of rod rings upon a continuously moving conveyor at its input end in such a way as to form the rings into a flat overlapping non-concentric pattern on the conveyor including

a. means for providing a continuous length of rod,

b. means for shaping the rod into a continuous series of rings,

c. a platform having a discharge end for receiving the rings from the shaping means maintained such that the discharge end of the platform and the input end of the conveyor are in close and parallel relation,

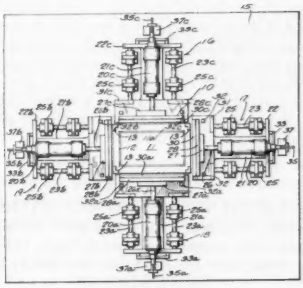
d. means for oscillating the platform transversely to the conveyor as the rings are deposited on the platform to decrease the edge packing effect of the ring pattern, and

e. means for continuously transporting the rings from the platform to the conveyor.

## 3,865,154
## SCREEN TENSIONING APPARATUS

**Roger Douglas Cox, Milwaukee, and Walter Bernard Michaels, Brookfield, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.**

**Filed Nov. 26, 1973, Ser. No. 419,223**
**Int. Cl. B21f** *33/02*
**U.S. Cl. 140—109** **13 Claims**



**1.** An apparatus for mounting a screening material in a frame member comprising supporting and driving means for at least one securing member, said supporting and driving means including means to support said securing member in one position and drive it to another position relative to said frame so as to engage said frame member, freely movable clamp means operatively associated with said supporting and driving means to hold said screening material across said

frame member and said securing member, and constant force tensioning means operatively associated with said clamp means to permit free movement of said clamp means in opposing directions and to hold said screening material under constant and uniform tension when said screening material is secured in said frame member.

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**3,865,155**

## WIRE TENSIONING AND TYING TOOL MEANS

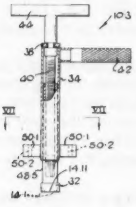
**Helmuth Spath, Pretoria, South Africa, assignor to Span-Fix (Proprietary) Limited, Pretoria, South Africa**

**Filed Sept. 14, 1973, Ser. No. 397,563**

**Claims priority, application South Africa, Sept. 26, 1972, 72/6597; Dec. 28, 1972, 72/9172**

**Int. Cl. B21f** *9/02*

**U.S. Cl. 140—123.5** **7 Claims**



1. A handtool for tensioning and binding a wire which is looped around an article and which has tail end portions extending from a cross-over region, the handtool comprising:

a. a foot member having a flat transverse pressing face on its outer end for seating on the cross-over region of the wire, handle means for holding the foot member to twist it about an axis normal to its pressing face, and two spaced notches converging towards the pressing face and having pairs of laterally spaced abutment faces extending oppositely away from the pressing face to receive in abutment the sides of the tail end portions of the wire adjacent the cross-over region.

b. holding means on opposite sides of the foot member for connection thereto of the tail end portions of the wire; and

c. a mechanism associated with the foot member and the holding means for displacing the holding means forcibly relative to the foot member, and for thereby applying tension to the tail end portions of the wire; whereby, on seating of the pressing face on the cross-over region, after the wire is tightly drawn around the article and on maintaining the tension in the tail end portions the pressing face is urged onto the cross-over region, and on twisting of the foot member about said axis normal to the pressing face, the abutment faces twist the tail end portions into interengaging hook formations.

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**3,865,156**

## POWERED STRAP TENSIONING AND SEVERING TOOL

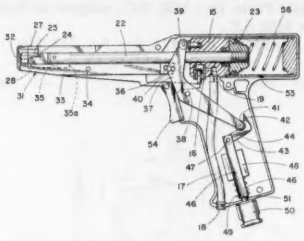
**Roy A. Moody, Flossmoor, and Raymond F. Roberson, Plainfield, both of Ill., assignors to Panduit Corp., Tinley Park, Ill.**

**Filed Sept. 17, 1973, Ser. No. 398,912**

**Int. Cl. B21f** *9/00*

**U.S. Cl. 140—123.6** **20 Claims**

1. A power-operated tool for tensioning and cutting a strap or the like comprising a housing, movable strap gripping means for gripping a strap and tensioning said strap about a bundle of wires or the like, strap cutting means for cutting said strap, motor means for driving said strap gripping means, biasing means for restraining movement of said strap cutting means until a predetermined tension has been produced in said strap, means mounting said motor means in said housing for relative movement between said motor means in said housing for relative movement between said motor means and said housing, whereby movement of said motor means once



the predetermined tension is reached in said strap actuates said strap cutting means.

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**3,865,157**

## FILLING OF CONTAINERS WITH LIQUIDS WHICH ARE DELETERIOUSLY INFLUENCED BY CONTACT WITH AIR

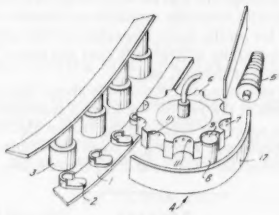
**Uwe Knabe, DO-Hombruch; Werner Heckmann, Dortmund, and Friedrich Rademacher, Kamen-Sudkamen, all of Germany, assignors to Holstein & Kappert Maschinenfabrik Phonix GmbH, Dortmund, Germany**

**Filed Jan. 19, 1973, Ser. No. 325,011**

**Claims priority, application Germany, Jan. 22, 1972, 2203075**

**Int. Cl. B67c** *3/10*

**U.S. Cl. 141—7** **8 Claims**



1. A method of filling containers with liquids which are deleteriously influenced by contact with air, comprising the steps of continuously moving a stream of containers towards a filling station; flushing the interior of each container while it is moving immediately upstream of the filling station with inert gas just prior to the arrival of the container at the filling station; presenting the just flushed advancing container at the filling station; and filling the container with liquid while it is located at said filling station.

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**3,865,158**

## REUSEABLE PRESSURIZED DISPENSER

**Robert B. Withrow, Arlington, Va., assignor to American La France Inc., Willoughby, Ohio**

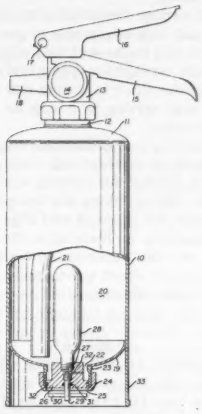
**Filed Apr. 27, 1973, Ser. No. 355,186**

**Int. Cl. B65b** *31/00*

**U.S. Cl. 141—19** **3 Claims**

1. A reuseable pressurized dispenser comprising a pressure vessel having filling and discharge openings therein, a valve body incorporating a discharge nozzle and a control valve therefor secured in said discharge opening and a closure member removably positioned in said filling opening, said closure member having communicating axial and transverse bores therein, portions of said axial bores being threaded, a pointed rod disposed in said axial bore for movement therein, a

threaded area on said rod engaged in one of said threaded portions of said axial bore, a replaceable gas cartridge, a threaded neck and seal on said gas cartridge engaged in one of said threaded portions of said bore and positioned adjacent said pointed rod so that axial movement of said pointed rod occuring when the same is rotated in one direction will puncture said seal to pressurize said dispenser and releaseable means on said pressure vessel normally holding said closure member in said filling opening, said means arranged to permit said closure member, the pointed rod and the replaceable gas cartridge engaged thereon to be placed into and removed from the pressure vessel as a unit.



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**3,865,159**

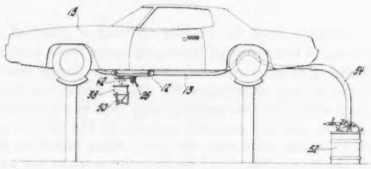
**CATALYTIC CONVERTER FILLING APPARATUS**

**Albert H. Mayfield, Lennon, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 3, 1973, Ser. No. 420,969**

**Int. Cl. B65b** *31/00, 1/26*

**U.S. Cl. 141—67** **3 Claims**



**1.** An apparatus for filling a catalytic converter with a catalyst material while the converter is mounted in an automobile exhaust system comprising: a container to hold the catalyst material, said container adapted to be suspended beneath the converter mounted in the automobile exhaust system, an unobstructed fill pipe attached to said container and having an opening therein to permit the catalyst material to flow from said container through the opening and into said fill pipe, means to prevent the catalyst material from spilling out of said fill pipe after passing through the opening in the fill pipe, suspension means to hold said fill pipe and container beneath the converter and within a fill opening in the bottom of the converter while the converter is being filled, an aspirator adapted to be connected to the exhaust system to create a suction through the exhaust system, the fill pipe, and converter to carry the catalytic material from said container upwardly against the force of gravity through the fill pipe and into the converter with the aspirated air being drawn through said fill pipe without being drawn through the catalyst material in the container, and a vibrator adapted to be attached to said converter to vibrate the converter as it is being filled to assure the catalytic material is compacted and the converter completely filled.

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**3,865,160**

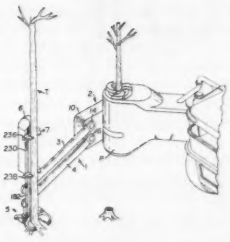
**SPLIT PHASE HEAD REACH SYSTEM FOR TREE HARVESTER**

**Bruce John McColl, Whitby, Ontario, Canada, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Continuation of Ser. No. 227,181, Feb. 17, 1972,. This application Jan. 23, 1974, Ser. No. 435,917**

**Int. Cl. A01g** *23/08*

**U.S. Cl. 144—3 D** **8 Claims**



**1.** A head reach system for a tree harvesting machine comprising:

a. a vertically oriented base assembly;

b. means connecting said base assembly to said harvesting machine, said connecting means and said base assembly being swingable in a horizontal plane relative to said harvesting machine;

c. a pair of arms each pivotally mounted at one of their ends on the base assembly, one above the other, and extending outwardly of said base assembly;

d. tree severing means attached to the outer end of a first arm of said pair thereof;

e. tree grasping and transfer means attached to the outer end of the second arm of said pair thereof, said second arm being movable independently of said first arm to move said tree grasping and transfer means from (i) a grasping position coaxial with said tree severing means and a tree being severed thereby, to (ii) a transfer position away from said tree severing means and out of coaxial relationship therewith to transfer said tree to a tree processing station and (iii) back to said grasping position;

f. means for actuating said tree severing means and for moving said first arm through a limited arc with respect to said base assembly independently of said second arm; and

g. means for actuating said grasping and transfer means and for moving the second arm through a limited arc with respect to the base assembly independently of said first arm between said grasping, said transfer and said grasping positions.

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**3,865,161**

**GROOVING MACHINE**

**Vito M. Vizziello, Hamden, Conn., and Charles A. Bouteiller, Great Barrington, Mass., assignors to New England Log Homes, Inc., New Haven, Conn.**

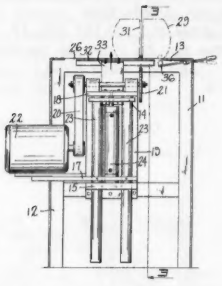
**Filed May 9, 1973, Ser. No. 358,680**

**Int. Cl. B27c** *5/02*

**U.S. Cl. 144—136 R** **6 Claims**

**1.** In a woodworking machine for cutting a groove in a workpiece, the combination of:

a frame having a worktable, said worktable having an opening therethrough;
a vertically movable first support member in said frame;
a saw assembly on said support member and vertically movable therewith, said assembly including a radial cutter head positioned for movement through said opening so as to cut a vertical groove in the face of workpiece on said worktable;



means positioned below said cutter head for actuating said cutter head;
elevator means for vertically moving said first support member with the saw assembly thereon; and
abutment means on said worktable for positioning said workpiece thereon;
a plate-like guard member connected to said first support member and positioned above said cutter head so as to precede said cutter head through said opening.

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**3,865,162**

**APPARATUS FOR SHAPING A WOODEN WORKPIECE ACCORDING TO A TEMPLATE CONFIGURATION**

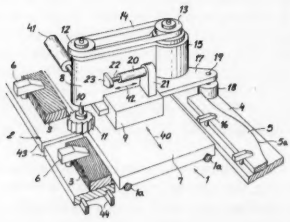
**Erich Schmidt, Wien, Austria, assignor to Maschinenfabrik Zuckermann Komm. Ges., Wien, Austria**

**Filed Mar. 19, 1973, Ser. No. 342,803**

**Claims priority, application Austria, Mar. 19, 1972, 2294/72**

**Int. Cl. B27g** *5/06*

**U.S. Cl. 144—144 R** **9 Claims**



1. An apparatus for reproducing the shape of a guide edge of a template in a wooden workpiece, said apparatus comprising:
a support;
a straight tool track on said support;
a carriage displaceable along said tool track;
means for displacing said carriage along said tool track;
a template table fixed on said support next to said tool track;
means for securing said template to said template table with said guide edge facing in one direction transverse to said track;
a straight workpiece track on said support parallel to said tool track;
a succession of workpiece tables displaceable along said workpiece track next to said tool track and past said template table;
means for securing respective wooden workpieces to said workpiece tables;
a slide on said carriage displaceable transverse to said track;
a roller on said slide engageable in the opposite direction transverse to said tracks with said edge of said template;
means on said carriage for urging said slide in said opposite direction for forcibly biasing said roller against said edge, said edge serving as a stop for said slide in said opposite direction;
a material-removing tool on said slide engageable with some of the workpieces adjacent said carriage; and
means on said carriage for rotating said tool on displacement of said carriage along said track for reproducing in said workpiece the shape of said edge whereby said tool exerts substantially no force upon the workpiece in said directions. in said workpiece the shape of said edge whereby said tool exerts substantially no force upon the workpiece in said directions.

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**3,865,163**

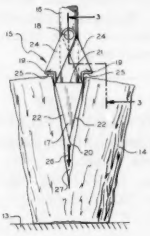
**SPLITTER HEAD WITH SPREADER ARMS**

**Charles M. Root, 104 Emerson Pl., Watertown, N.Y. 13601**

**Filed May 15, 1974, Ser. No. 470,058**

**Int. Cl. A47j** *49/02*; **B27l** *7/00*

**U.S. Cl. 144—193 A** **3 Claims**



1. A splitter head for rapidly splitting a piece of wood, comprising: a metal wedge having opposite faces terminating in a splitting edge at one end and a blunt wedge end at the other end, a post secured to the wedge projecting from the blunt end away from the splitting edge, and two spreader arms each having one end pivotally secured to the post at a point spaced from the blunt end, the arms being biased to project toward the wedge blunt end on opposite sides of the post and having their other ends adapted to swing away from the post in a direction outward from the wedge opposite faces, each arm other end normally having a portion extending away from the adjacent wedge opposite face for engaging a portion of the wood being split on either side of a split made by the wedge edge for spreading togglewise and speeding the splitting of the wood as the wedge is driven into the wood.

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**3,865,164**

**CUTTER FOR WOOD COMMINUTING MACHINE**

**Hans Sybertz, Hargesheim, Germany, assignor to Hambak Maschinenfabrik KG, Sandweg (Planiger Str.), Germany**

**Filed Feb. 20, 1973, Ser. No. 333,691**

**Claims priority, application Germany, Feb. 24, 1972, 2208687**

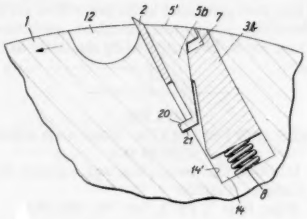
**Int. Cl. B27g** *13/00*

**U.S. Cl. 144—230** **13 Claims**

1. A cutter for a wood-comminuting machine or the like, comprising:

a rotatable generally cylindrical blade drum formed with an axially extending outwardly opening slot having a leading flank snd a trailing flank relative to the direction of rotation of said drum;

a flat blade received in and lying against said leading flank of said slot and having a cutting edge projecting from said slot;



a first wedge received between said trailing flank of said slot and said blade for retaining the latter against the leading flank, said first wedge having outwardly converging faces; a second wedge having inwardly converging faces and received between said first wedge and said blade; and

form-locking means between said second wedge and said drum limiting outward displacement of said second wedge from said drum.

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**3,865,165**

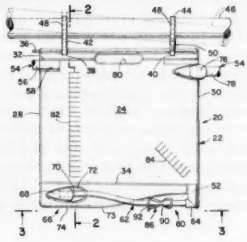
## UNIVERSAL FACED BODY FLUID DRAINAGE BAG WITH UNIVERSAL DRAINAGE MEANS

**Daniel S. Glass, 145 W. 86th St., New York, N.Y. 10024**

**Filed Oct. 25, 1973, Ser. No. 409,709**

**Int. Cl. A61g** *7/06*

**U.S. Cl. 150—1** **9 Claims**



**1.** A universal body fluid drainage bag comprising a body portion including an envelope-like reservoir, said body portion comprising flexible sides, inlet means, drainage means, and drainage means securing means; in which each of said flexible sides forms a face comprising calibration means, and in which the drainage means comprises a liquid conduit including at least one flexible portion, said drainage means having a portion connected to a lower portion of the reservoir and at least one end portion for selective positioning with relation to said drainage means securing means so that the drainage means end portion may be removed from the drainage means securing means to extend selectively laterally beyond either of said sides for drainage, and in which the drainage means conduit is tubular in shape and the drainage means securing means is in the form of a pouch located below the reservoir for positioning an end of the drainage means tubing, and in which the drainage means securing pouch is located within lower portions of the sides of the body portion and there is a through opening transverse to said sides at an entrance to said pouch.

**3,865,166**

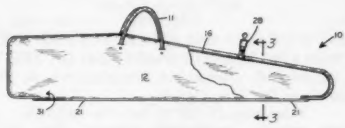
## WEAPONS CASE

**Eugene M. Pedro, White Bear Lake, Minn., assignor to Carl Pedro and Sons, Inc., St. Paul, Minn.**

**Continuation of Ser. No. 196,687, Nov. 8, 1971, abandoned. This application Aug. 9, 1973, Ser. No. 386,865**

**Int. Cl. A45c** *11/00*

**U.S. Cl. 150—52 R** **6 Claims**



**1.** A protective elongated flexible sporting goods carrier for a sporting goods article having a shape conforming to the outline of an elongated article comprising: a first section made from a molded flexible plastic, said first section having a first edge; a second section made from a molded flexible plastic, said second section having a second edge, said first section and said second section substantially similar in shape and size so that each of said first and second sections encompasses about half of an article when said first section and said second section are closed together; a flexible hinge, said flexible hinge connecting a portion of said first edge and said second edge to thereby provide means for opening and closing said first section and said second section relative to one another so that when said article carrier is in an open position an elongated weapon can be placed on either said first section or said second section; a lining located on said first section and said second section to protect the article from abrasion from the molded flexible plastic and to cushion the article against shocks as it is carried; flexible fastening means connecting a first portion of said first edge of said first section to a first portion of the second edge of said second section, said fastening means coacting with said flexible hinge to provide an enclosure for holding an article in the article carrier, said article carrier having sufficient flexibility to flex or bend without receiving permanent damage; a first molded edge piece for covering a second portion of said first edge of said first section; a second molded edge piece for covering a second portion of said second edge of said second section, said first molded edge piece and said second molded edge piece located substantially coextensive with said flexible fastening member; and further means located on said article carrier to allow one to carry the article carrier in one's hand.

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**3,865,167**

## PNEUMATIC TIRES

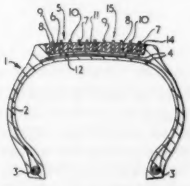
**Karl Gebert, Klein-Auheim, Germany, assignor to Dunlap Ltd., London, England**

**Filed May 3, 1973, Ser. No. 356,940**

**Claims priority, application Germany, May 3, 1972, 2221699**

**Int. Cl. B60c** *11/16*

**U.S. Cl. 152—212** **21 Claims**



**1.** A pneumatic tire comprising at least one carcass ply of radially disposed cords, a breaker layer, two bead cores, two

sidewall portions and a tread portion, a plurality of anti-skid elements being embedded in the tread portion, the anti-skid elements each comprising at least one metal wire disposed substantially perpendicularly to the surface of the tread portion, and protruding radially outwardly of the tread surface, said at least one wire being sheathed in rubber, the rubber of the tread portion being softer than and having a greater elasticity than the sheathing rubber.

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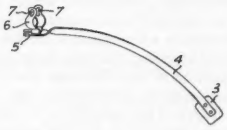
**3,865,168**
**SNOW CHAINS AND APPARATUS FOR THEIR AUTOMATIC REMOTE FASTENING ON THE TIRE**

**Alain Bourcier de Carbon de Previnquieres, 6, Boulevard Victor Hugo 06, Nice, France**

**Filed May 21, 1973, Ser. No. 362,168**
**Claims priority, application France, May 23, 1972, 72.19601; June 26, 1972, 72.24178; Aug. 23, 1972, 72.30708**
**Int. Cl. B60c** *27/06*
**U.S. Cl. 152—213 A** **17 Claims**




1. Apparatus for automatic remote fastening of the hook and link of the longitudinal internal chain of a snow-chain, which comprises a pliable or flexible strap terminated by a hook fastening means, the thickness of which fastening means is less than the width of the opening in the link, and a rigid rod having no mechanical connection with the pliable or flexible strap and terminated by a means for holding the link, keeping the latter in a plane substantially perpendicular to the rod while leaving the opening in the link clear.

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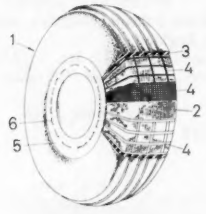
**3,865,169**
**RADIATION TIRE**

**Yasuo Tsuruta, No. 22-2, 4-chome, Tokyo, Japan**

**Filed June 22, 1973, Ser. No. 372,532**
**Claims priority, application Japan, June 24, 1972, 47-63481**
**Int. Cl. B60c** *19/06*
**U.S. Cl. 152—330 C** **3 Claims**




1. In a rotary wheel, an outer tire and an inner metallic rim surrounded and engaged by said tire, said tire having an outer rubber layer and an inner fiber layer engaging said outer layer, and said layers forming for said tire an outer circumferential wall and a pair of side walls extending, respectively, inwardly from opposed peripheral edges of said outer circumferential wall into engagement with said rim, and a single network of elongated thermally conductive members situated between said inner and outer layers of said outer tire wall, said network being made up of circumferentially extending thermally conductive members distributed between said side walls of said tire and transversely extending thermally conductive members intersecting and extending across said circumferentially extending members and distributed circumferentially along said circumferential wall, said transverse members each having extensions extending inwardly substantially radially along said side walls between said layers thereof into engagement with said rim so that heat generated in the tire will be carried away by said thermally conductive members and transmitted thereby to said rim to be dissipated by the latter to the outer atmosphere.

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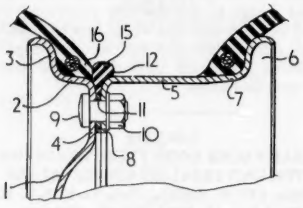
**3,865,170**
**WHEELS AND PNEUMATIC TIRE AND WHEEL ASSEMBLIES**

**William E. Mitchell, Conventry, England, assignor to Dunlop Limited, London, England**

**Filed June 7, 1972, Ser. No. 260,462**
**Claims priority, application Great Britain, June 16, 1971, 28097/71**
**Int. Cl. B60b** *23/10*; **B60c** *5/16*, *19/00*
**U.S. Cl. 152—386** **8 Claims**




1. A rim for a tubeless pneumatic tire comprising a first rim part comprising a rim flange and associated bead seat and a radially inwardly extending attachment flange portion adjacent the toe of the bead seat, a second rim part having a bead retaining flange at one side and a radially inwardly extending attachment flange at the other side with a flat rim base portion positioned therebetween, means securing the rim parts along said attachment flanges, a resilient elastomeric sealing ring sandwiched therebetween so as to extend continuously around the joint between the rim parts, said resilient elastomeric sealing ring having a portion projecting radially outwardly for engagement with an adjacent tire bead so as to resist axially inward movement of the adjacent tire bead from the bead seat.

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**3,865,171**
**LOWER BEAD BREAKER ADAPTER**

**William G. Brosene, Jr., Cincinnati, Ohio, assignor to Magnum Automotive, Inc., Cincinnati, Ohio**

**Filed Sept. 24, 1973, Ser. No. 400,390**
**Int. Cl. B60c** *25/00*
**U.S. Cl. 157—1.24** **5 Claims**

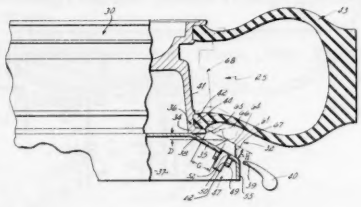
1. A modified table structure for a tire changer machine, said table structure including

structure defining a first hole in the machine's table, said hole being positioned in the operational path of a lower bead breaker's blade, and

an adapter removably connected to the machine's table when a tire is to be demounted from that type wheel configuration where an undercut gap is established between the wheel rim's bottom edge and the table when the wheel has been locked in place onto said table, and said adapter including

a head portion that extends upwardly off said table's surface when said adapter is connected to said table, said head portion being seated on said table to provide an interme-

diate tracking surface between the table's surface and the wheel's outer peripheral surface over which the lower bead breaker's blade can ride during operation thereof, thereby preventing the lower bead breaker's blade from becoming entrapped within the undercut gap prior to contacting the tire's lower bead area, and



a post fixed to the underside of said head, said adapter being removably connected to the machine's table simply by dropping said post into said hole, thereby permitting said adapter to be easily and quickly connected to and disconnected from said table.

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**3,865,172**

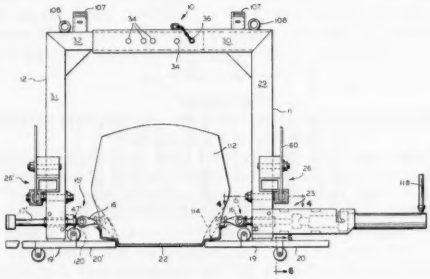
**TIRE BEAD BREAKING APPARATUS**

**Charles Earl Branick, 1601 S. 9th St., Fargo, N. Dak. 58102**

**Filed Feb. 1, 1973, Ser. No. 328,643**

**Int. Cl. B60c** *25/06*

**U.S. Cl. 157—1.26** **26 Claims**



**1.** A device for breaking tire beads comprising:

frame means having a pair of arm means for straddling a wheel rim,

rim engaging means mounted on each of said arms each of said rim engaging means being movable in a direction generally parallel to the axis of said wheel rim,

first means mounted on each of said arm means for movement in a direction generally parallel to said axis,

bead breaking means mounted on one end of each of said first means and directed inwardly toward said tire, said first means being constructed and arranged to position said bead breaking means in contact with the tire bead adjacent said wheel rim,

second means engageable with said first means for forcing said bead breaking means into high pressure engagement with said tire bead to move the same away from the wheel rim, said second means being operative to apply a bead breaking force to the other end of said first means, the application of a bead breaking force to said first means being operative to lock said rim engaging means in position.

**3,865,173**

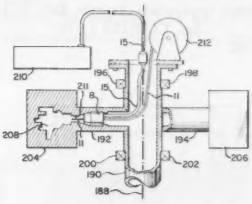
**THE ART OF CASTING METALS**

**Roderick Rohrberg, Torrance, Calif., assignor to North American Rockwell Corporation and Air Products and Chemicals, Inc., both of Allentown, Pa., part interest to each**

**Division of Ser. No. 830,565, May 8, 1969, Pat. No. 3,604,889, which is a continuation-in-part of Ser. No. 693,365, Dec. 16, 1967, abandoned. This application Apr. 29, 1970, Ser. No. 43,643**

**Int. Cl. B22d** *27/02*

**U.S. Cl. 164—46** **3 Claims**



**1.** A method for precision casting molten metal using a die block with an opening to receive molten metal, said method comprising:

positioning an elongated consumable metallic electrode adjacent said opening, said electrode being made of said metal,

forming an electric arc between said electrode and said die block so that said electrode melts to produce said molten metal,

directing a stream of ionizable gas towards said arc and said opening with sufficient force to penetrate said arc and to cause said molten metal to form a stream and enter said opening so that said molten metal solidifies within said die block, and

feeding said electrode into the arc to maintain the arc until said die block is filled with metal.

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**3,865,174**

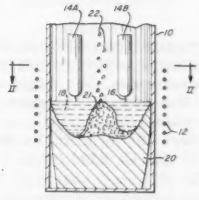
**METHOD FOR THE NONCONSUMABLE ELECTRODE MELTING OF REACTIVE METALS**

**Russell C. Buehl, Beaver, Pa., assignor to Crucible Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 300,639, Oct. 25, 1972, abandoned. This application Jan. 23, 1974, Ser. No. 435,915**

**Int. Cl. B22d** *27/02*

**U.S. Cl. 164—52** **6 Claims**



**2.** In the vacuum arc melting of reactive metals and alloys in a mold having a nonoxidizing atmosphere therein by the use of at least two nonconsumable electrodes each adapted to supply melting arcs offset from the longitudinal axis of the mold, the improvement comprising feeding metal or alloy particles for melting to substantially the center or longitudinal axis of the mold, regulating the feed rate and arc current to produce during melting within said mold an embryo casting having a first bottom, solidified portion with a top surface, a second partially solidified portion of a generally conical configuration extending axially with respect to said mold from the

top surface of said first solidified portion, and a third liquid toroidal portion encircling axially said second partially solidified portion.

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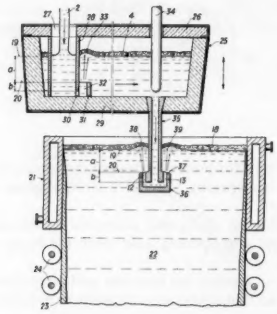
**3,865,175**

## PROCESS FOR SEPARATING NON-METALLIC INCLUSIONS FROM HOT LIQUID METAL

**Friedrich Listhuber; Thorwald Fastner; Ernst Bachner, and Otto Hoyer, all of Linz, Austria, assignors to Vereinigte Osterreichische Eisen-und Aktiengesellschaft, Linz, Austria**

**Filed Feb. 1, 1973, Ser. No. 328,613**
**Claims priority, application Austria, Feb. 3, 1972, 858/72**
**Int. Cl. B22d** *11/10*
**U.S. Cl. 164—82** **9 Claims**



1. In a process for separating non-metallic inclusions from hot liquid metal in a continuous casting plant, in which the metal flows into a water-cooled mould containing a quantity of liquid metal having a surface covered with a layer of slag and in which a bar of metal is drawn out of the mould and further cooled, the improvement comprising deflecting the liquid metal, when it enters the mould, into at least one stream of metal, the stream originating at a predetermined distance of from 3 to 30 cm below the surface of the liquid metal in the mould and being directed in an upward direction to impinge against the layer of slag and form a wave in the layer of slag without previously contacting any lateral portion of a solidifying shell of the bar of metal, the speed of the stream of metal being adjusted to remain within a range of from 3.5 to 31 cm/sec when the predetermined distance is 3 cm and linearly increasing with distance to a range of from 17.5 to 45 cm/sec when the predetermined distance is 30 cm.

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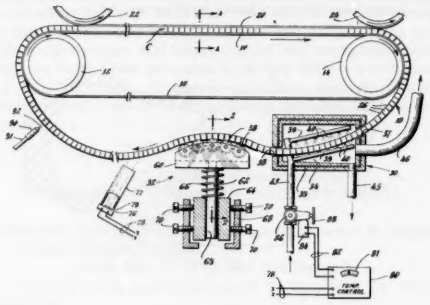
**3,865,176**

## CASTING METHOD FOR TWIN-BELT CONTINUOUS METAL CASTING MACHINES

**John Mary-Anthony Dompas, Olen, Belgium, and Robert William Hazelett, Winooski, Vt., assignors to Hazelett Strip Casting Corporation, Winooski, Vt.**

**Filed Sept. 28, 1973, Ser. No. 401,703**
**Int. Cl. B22d** *11/06*
**U.S. Cl. 164—87** **7 Claims**

1. The improved method of casting molten metal in a twin-belt metal casting machine wherein two side dams each revolve in a loop passing along a casting zone from its input end between a pair of revolving casting belts to define a moving mold and wherein the loop of the travelling side dams returns from the output end to the input end of the casting zone along a path which is located away from the casting zone, said improved method comprising the steps of constructing a pair of endless side dams each having a multiplicity of metal damblocks strung in end-to-end relationship on a flexible metal strap loop, allowing every damblock on each strap to be free to slide relative to its strap, and as both of the side dams are travelling from the output end to the input end deflecting them to travel along a smoothly curved path section which is convex toward the interior of the side dam loop, said convex curved path section having sufficient convexity for forcing wedge-shaped spaces to occur between adjacent damblocks



on said curved path section for tightly pressing the damblocks together in end-to-end abutting relationship along both sides of the casting zone, thereby ensuring that the molten metal is cast in the moving mold without burrs.

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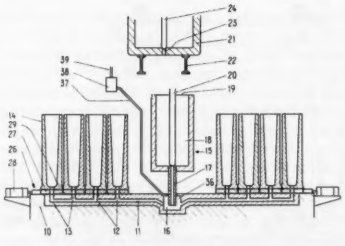
**3,865,177**

## METHOD OF BOTTOM-CASTING INGOTS

**Kozma Ahacic, Fagersta, and Lars-Einar Ljungstromer, Torshalla, both of Sweden, assignors to Granges Engineering AB, Vasteras, Sweden**

**Filed June 7, 1972, Ser. No. 260,375**
**Int. Cl. B22d** *35/04*
**U.S. Cl. 164—133** **1 Claim**



1. In a method of bottom-casting ingots, slabs and the like in molds located on a casting platform with mold gates in register with and communicating with outlet openings discharging in the casting platform, said casting platform including a chamber communicating through runners and distributing channels with a vertically extending teeming gate arrangement from which the molds are gravitationally filled with molten metal to the desired level, comprising the steps of: filling said molds with said molten metal to a desired level; concurrently introducing a quantity of a pressurized inert gas into said chamber above the molten metal conveyed therethrough so as to form an inert gas cushion above the molten metal in said chamber during casting thereof; closing said teeming gate arrangement; closing the gates of respective of said filled molds so as to isolate said distributing channels, said runners and said chamber from the surrounding atmosphere; and upon closing of said teeming and mold gates reducing the pressure of said inert gas above the molten metal in said chamber to effect a return flow of molten metal from said runners and distributing channels into said chamber for preventing the level of molten metal remaining in said chamber, runners and distributing channels from reaching a point above the level of

the outlet openings prior to removing the filled molds and replacement thereof with empty molds.

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**3,865,178**

## APPARATUS FOR CASTING A HOLDING BLOCK ON AN OPHTHALMIC LENS

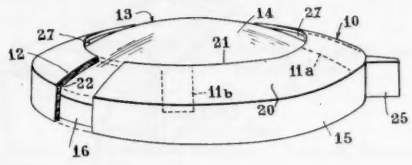
**Serge Legendre, Epinay Sur Seine, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville Le Pont, France**

**Filed May 21, 1973, Ser. No. 361,971**

**Claims priority, application France, May 29, 1972, 72.19131**

**Int. Cl. B22d** *19/00*

**U.S. Cl. 164—334** **9 Claims**




1. Mounting member for use in casting a holding block on an ophthalmic lens blank finished on one face only, and adapted for fitting to the blank through centering means, means for fixing the mounting member on said blank in the angular direction, and means for engaging the finished face of said blank, said mounting member having a substantially annular configuration with an annular portion adapted to engage the finished face of the blank, said centering means comprising a cylindrical skirt forming a downward extension of said annular portion and adapted to engage with a slightly clamping force the outer cylindrical edge of the blank, and said means for fixing the blank in the proper angular direction comprising a projection carried by said skirt and engageable in a matching notch formed in the edge of said blank.

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**3,865,179**

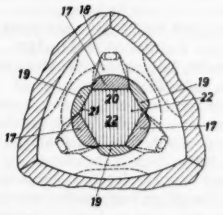
## PISTON FOR ROTARY PISTON MACHINES AND MEANS FOR ITS MANUFACTURE

**Johannes Steinwart, Bad Friedrichshall, and Max Ruf, Oberisesheim, both of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm; Audi NSU Auto Union Aktiengesellschaft, Wurttemberg; Wankel GMBH, Lindau and Wankel GMBH, Bodensee, all of, Germany**

**Division of Ser. No. 315,581, Dec. 15, 1972, Pat. No. 3,836,294. This application Oct. 29, 1973, Ser. No. 410,803**

**Int. Cl. B22d** *33/04*

**U.S. Cl. 164—340** **3 Claims**




1. A tool for producing a three-apex piston by die-casting, including two cores capable of being withdrawn in opposite directions, of which the one core has a hub and a number of movable core portions equal to the number of apices in the piston, arranged around the hub for forming the three inlet passages and portions for forming the inner surface of the piston between the inlet passages and the other core has a hub and a similar number of core portions arranged around it for forming the outlet passages of the piston cavities and core portions for forming the inner surface of the piston between the outlet passages.

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**3,865,180**

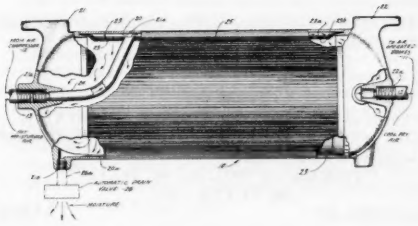
## MOISTURE SEPARATING TANK

**John D. McKenney, South Laguna, and Thomas R. Rumsey, Inglewood, both of Calif., assignors to Royal Industrial Inc., Pasadena, Calif.**

**Division of Ser. No. 188,291, Oct. 12, 1971, Pat. No. 3,774,679. This application June 4, 1973, Ser. No. 366,337**

**Int. Cl. F28f** *17/00*

**U.S. Cl. 165—1** **2 Claims**



1. A method of separating moisture from a compressed airstream including the steps of providing a tank having a thin fluid conduit in cross-section selected relative to the pressure drop of the fluid through the tank to optimize heat transfer and constructed of the inner wall of the tank and a thermal insulator to cause a compressed airstream to be conveyed through the tank by means of such a fluid conduit as a fluid sheet, the tank wall being constructed of a thermal conductor, conveying a fluid laden compressed airstream to the tank to cause the airstream to flow through the tank by means of the fluid conduit from the top of the tank and then down around the tank at a velocity selected for producing a heat transfer to the outer surface of the tank without a substantial drop of pressure in the conveyed airstream to substantially cool the airstream and thereby separate the moisture from the compressed airstream, and

conveying the dry, compressed airstream out of the tank by means of the fluid conduit.

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**3,865,181**

## CENTRAL TEMPERATURE CONTROLLING APPARATUS HAVING SEPARATE PRESSURE AND TEMPERATURE CONTROL MEANS

**Keijiro Mori, Nara-Ken; Masahiro Indo, Nara, and Taro Yamamoto, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 21, 1973, Ser. No. 334,355**

**Claims priority, application Japan, Feb. 14, 1973, 48-18812**

**Int. Cl. F24f** *3/00*

**U.S. Cl. 165—22** **8 Claims**

1. A central temperature controlling apparatus comprising: a blower;

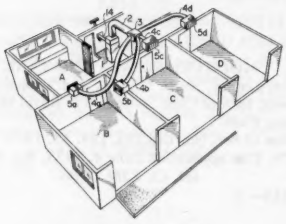
heat exchanger means for modifying the temperature of air supplied by said blower;

a plurality of branch ducts leading the air supplied by said blower to respectively associated individual rooms;

means for regulating the rate of supply of air to each of said individual rooms;

pressure control means to control the pressure of supply air from said blower in accordance with the pressure of said air in a common path upstream of said branch ducts; and

temperature control means to control the transfer of heat between the air supplied by said blower and said heat



exchanger in accordance with the temperature of said air in said common path.

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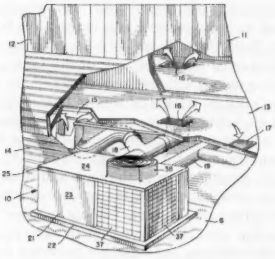
**3,865,182**

**COMBINATION AIR CONDITIONER AND HEATER**

**Armond L. Blossom, Wichita, Kans., assignor to The Coleman Company, Wichita, Kans.**

**Filed Aug. 30, 1973, Ser. No. 393,124**
**Int. Cl. F25b** *29/00*
**U.S. Cl. 165—27** **1 Claim**



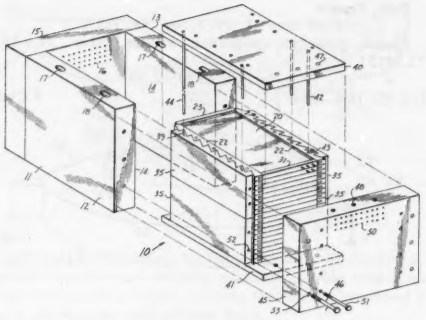
1. In combination with a mobile home, an air conditioner unit mounted on the ground outside of and separate from said mobile home, said unit including a casing providing a weatherproof compartment having an air inlet and an air outlet, duct means secured to each of the air inlet and the air outlet and connected to said mobile home, an air blower mounted in said compartment, the air blower comprising a blower housing having an air inlet and an air outlet, an air guide surface for directing air from the inlet to the outlet, and a blower wheel rotatably mounted within the blower housing for forcing air over the air guide surface and through the air outlets of the blower housing and the casing, power means within the casing for rotating the blower wheel, and cooling means mounted within said compartment between the air inlet of the compartment and the air inlet of the air blower for cooling the air passing through the air inlet of the air blower, wherein the improvement comprises: electric heating elements secured to the blower housing adjacent the air guide surface for heating the air passing over the air guide surface, control means for selectively activating the heating means or the cooling means, said power means comprising a two-speed motor which is operable at a relatively high speed and a relatively low speed, said control means including means for operating said motor at the low speed when the heating means is activated.

**3,865,183**

**COOLING SYSTEMS FOR ELECTRONIC MODULES**

**Maurice D. Roush, Chippewa Falls, Wis., assignor to Control Data Corporation, Minneapolis, Minn.**

**Filed Oct. 23, 1973, Ser. No. 408,887**
**Int. Cl. F28f** *7/00*
**U.S. Cl. 165—80** **14 Claims**



1. An electronic circuit module comprising:

a thermally conductive housing supporting a stack of a plurality of substantially planar circuit boards, said housing including side wall members defining internal surfaces; fluid conduit means disposed in said wall members for containing coolant;

thermally conductive spacer means including a first surface adapted to bear against a respective internal surface and a sawtooth edge portion having surface portions disposed at a predetermined angle to said first surface;

a thermally conductive edge member mounted to opposite side portions of each of said circuit boards each edge member having a sawtooth edge portion defining a nominal edge plane of said board, such nominal edge plane being disposed substantially parallel to said internal surface of the respective side wall member, the sawtooth edge portion of each edge member including first surface portions disposed at a predetermined angle to said nominal plane and second edge portions forming transitions between adjacent first edge portions; and

torque means engaging said conductive spacer means to move said conductive spacer means at said predetermined angle to the length of said nominal plane to wedge said conductive spacer means between said respective wall member and the respective conductive edge members of said stack of circuit boards.

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**3,865,184**

**HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME**

**George M. Grover, Los Alamos, N. Mex., assignor to Q-Dot Corporation, Santa Fe, N. Mex.**

**Continuation of Ser. No. 113,571, Feb. 8, 1971, abandoned. This application Apr. 13, 1973, Ser. No. 350,799**
**Int. Cl. F28d** *15/00*
**U.S. Cl. 165—105** **20 Claims**

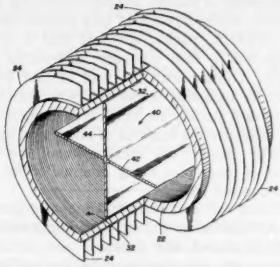
1. The thermal transfer device comprising:

a generally straight, tubular sealed envelope having walls and at least two sections between which thermal energy is to be transferred,

a working fluid having a liquid phase and a vapor phase at the operating temperature of the device, the liquid phase standing in at least one section to a level less than the height of the portion of the envelope forming the section, and

a plurality of capillary grooves having openings narrower

than other portions of said grooves formed in the walls of the envelope in at least said one section for transporting



the liquid phase upwardly above the level of the liquid phase in said one section by capillary action.

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**3,865,185**

**HEAT EXCHANGER**

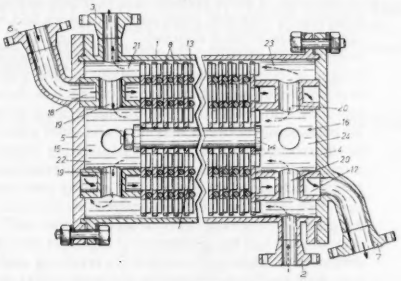
**Karl Robert Ambjorn Ostbo, Storgatan 2, S-510 80, Tranemo, Sweden**

**Filed Sept. 7, 1972, Ser. No. 287,041**

**Claims priority, application Sweden, Sept. 8, 1971, 11370/71**

**Int. Cl. F28f** *3/08*

**U.S. Cl. 165—165** **3 Claims**



1. A heat exchanger comprising, in combination:

a plurality of parallel and axially aligned flat metal discs, each having an inner annular row of circumferentially spaced openings, an outer annular row of circumferentially spaced openings and at least one intermediate annular row of circumferentially spaced openings; said rows of openings being similarly arranged on each disc whereby adjacent annular rows of openings of each disc are separated by flat annular regions devoid of openings with such flat regions of adjacent discs being mutually opposed;

a set of concentrically arranged sealing rings disposed between and spacing apart each adjacent pair of said discs, said sealing rings of each set being of different diameters to seat upon the mutually opposed flat regions of the respective discs to interrupt communication between adjacent rows of openings thereof;

compression means for securing said discs and intervening sealing rings in a sandwiched stack whereby fluid tight passages of annular cross section are formed through corresponding rows of said openings from one end of the stack to the other;

first header means for directing one fluid through an alternate pair of said annular passages and having an inlet conduit at one end of said stack and an outlet conduit at the other end of the stack; and

second header means enclosed by said first header means for directing a second fluid through at least that annular passage intervening between said alternate pair thereof and having an inlet conduit at said other end of the stack passing through said first header means and an outlet conduit at said one end of the stack passing through said first header means whereby said second fluid flows countercurrently with respect to said one fluid with heat exchange therebetween being effected through said flat annular regions of the discs, said second header means comprising first and second annular members, said first annular member defining an annular channel discharging at said other end of the stack into said intervening annular passage and surrounding an inner space from which fluid is discharged from the innermost of said alternate passages and said first header means comprising a first end portion enclosing said first annular member to define therewith an annular outer space from which fluid is discharged from the outer of said alternate passages, said inner and outer spaces being in communication and said first annular member being connected to said inlet conduit of the second header means, said second annular member defining an annular chamber receiving fluid at said one end of the stack discharged from said intervening passage and surrounding a second inner space discharging fluid into said innermost of the alternate passages and said first header means comprising a second end portion enclosing said second annular member to define therewith an annular second outer space discharging fluid into said outer of the alternate passages, said second inner and outer spaces being in communication and said second annular member being connected to said outlet conduit of the second header means.

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**3,865,186**

**METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL**

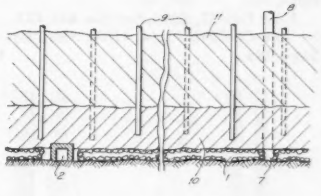
**Hans Joachim Von Hippel, deceased, late of P.O. Oberstenweiler, Oberstenweiler, Germany (by Sophie Von Hippel, heir and legal representative), and Mila Von Hippel, heir and legal representative, Oberstenweiler, Germany**

**Filed July 17, 1972, Ser. No. 272,658**

**Claims priority, application Germany, July 16, 1971, 2135618**

**Int. Cl. E21b** *43/24*

**U.S. Cl. 166—256** **8 Claims**

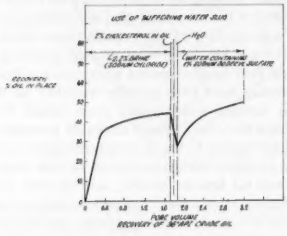


1. A method of gasifying underground deposits of coal, comprising the steps of forming in an underground coal deposit a first conduit system including at least one channel which extends along a face of the deposit; forming in said coal deposit a second conduit system having a plurality of inlets which are located in said deposits inwardly spaced from said face by a substantial distance; combusting said coal deposit so that the fire front extends along said face and consumes said deposit in direction inwardly of said face, whereby the heat of combustion expels high-value gases from said coal deposit whereas said combustion results substantially only in the formation of lower-value combustion gases; withdrawing said high-value gases through said inlets which are inwardly spaced from said face; withdrawing said lower-value combustion gases through said channel which extends along said face and the fire front; and terminating the withdrawal of said high-value gases through respective ones of said inlets when the fire front reaches the same.

## 3,865,187
## OIL RECOVERY PROCESS USING SURFACTANT MIXTURES

Joseph T. Carlin, and Richardo L. Cardenas, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 6, 1974, Ser. No. 440,095
Int. Cl. E21b *43/22*
U.S. Cl. 166—273 18 Claims

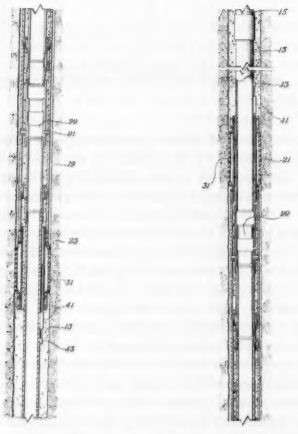


1. A method of recovering hydrocarbons from a subterranean hydrocarbon-bearing formation traversed by at least one injection well and one production well comprising the steps of:
a. injecting into said formation via said injection well a first slug of hydrocarbon solvent containing a mono-unsaturated secondary alcohol,
b. injecting said formation a second slug of an aqueous medium containing a sulfate salt of a fatty alcohol, said sulfate salt having from 8–20 carbon atoms per molecule, and said aqueous slug also containing a water soluble alkali metal salt,
c. injecting water or brine as a drive agent sufficient to drive said slugs and said hydrocarbons through said formation toward said production well,
d. recovering said hydrocarbons from said production well.

## 3,865,188
## METHOD AND APPARATUS FOR SELECTIVELY ISOLATING A ZONE OF SUBTERRANEAN FORMATION ADJACENT A WELL

Glenn O. Doggett, and Bobby Joe Hallmark, both of Fort Worth, Tex., assignors to Gearhart-Owen Industries Inc., Fort Worth, Tex.

Filed Feb. 27, 1974, Ser. No. 446,422
Int. Cl. E21b *33/14, 43/04, 33/124*
U.S. Cl. 166—285 14 Claims



1. In apparatus for driling and completing a well penetrating subterranean formations and having a conduit string therein, a selective isolation tool for isolating a zone, comprising a plurality of serially connected modules that include:
a. a plurality of packer modules including at least top and bottom modules; each of said packer modules including an inflatable packer element that is expansible when subjected to fluid pressure therewithin outwardly into sealing contact with the wall of said well; said packer modules including respective outer tubular sections carrying said packer elements and concentrically disposed about respective sections of inner pipe so as to define an annular passageway therebetween; the respective sections of inner pipe being adapted to be connected into said conduit string;
b. inflation valve and conduit means connected with said packer elements and in fluid communication with the interior of said inner pipe;
c. at least one extension module disposed intermediate and connected with said packer modules; said at least one extension module including:
i. a section of inner pipe adapted to be connected sealingly and serially into said conduit string and having adequate structural strength to sustain the weight of conduit string therebelow in said well and sustain the torque of making a connection between modules;
ii. a section of outer pipe adapted to be connected sealingly and serially into an outer string of conduit and having adequate structural strength to sustain the weight of conduit string therebelow in said well and sustain the torque of making a connection between modules;
iii. a plurality of force transfer-spacer means connected respectively with said inner and outer pipes and maintaining them in fixed concentric and longitudinal relationship with adequate structural strength to sustain the weight of conduit string therebelow in said well and sustain the torque of making a connection between modules; said concentric relationship defining an annular passageway between said inner and outer pipes; and
iv. interconnection means for connecting respective modules to contiguous modules; said interconnection means including first and second mating joint halves, said first joint half being disposed at one end and adapted for inserting into a second joint half; said second joint half being disposed at the other end of said extension module and adapted for receiving said first joint half; said interconnection means including mating and sealing threaded sections on one of said sections of pipe and mating longitudinally slidable and sealing sections on the other of said sections of pipe such that said extension module can be connected to contiguous modules by stabbing and screwing only one set of said threaded sections together and effecting longitudinal sealing interconnection of both said inner and outer pipes;
whereby any predetermined length isolation tool can be made up and either said inner pipe can suspend from a travelling block of a rig and sustain the weight of said conduit string or said outer pipe can be set with slips on said rig and sustain the weight of said conduit string and torque necessary to make up said modules of said isolation tool at said well.

## 3,865,189
## METHODS FOR SELECTIVE PLUGGING

Robert H. Friedman, Houston, Tex., assignor to Getty Oil Company, Los Angeles, Calif.

Division of Ser. No. 270,244, July 10, 1972, Pat. No. 3,811,508. This application Apr. 1, 1974, Ser. No. 456,783
Int. Cl. E21b *33/13*
U.S. Cl. 166—294 4 Claims

1. A method for selectively plugging water-rich strata of a subterranean formation containing strata which are water-rich and other strata which are oil-rich, said water-rich strate containing a significant amount of metal ions, and said strata having at least one borehole therein, comprising:

providing a dilute aqueous composition of a water-soluble, oil-insoluble metal soap of a high-molecular-weight acid;
passing said composition into said borehole;
injecting said composition into said formation at a pressure sufficient to overcome the natural formation pressure;
reacting said soap with the metal ions in said water-rich strata to form as a reaction product, a second metal soap of said acid, said second metal soap being water-insoluble and oil-soluble, said reaction product being effective to greatly reduce the permeability of said water-rich strata, over a relatively long distance and over a relatively long period of time.

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**3,865,190**

## HYDRAULIC FRACTURING METHOD

**Charles A. Christopher, Houston, and Joseph C. Allen, Bellaire, both of Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed July 9, 1973, Ser. No. 377,865**
**Int. Cl. E21b** *43/26*
**U.S. Cl. 166—308** **13 Claims**

**1.** In a method for increasing the productivity of a subterranean formation penetrated by a well wherein a fracturing fluid is forced down the well to the formation and increasing the pressure on the fracturing fluid in order to rupture the formation rock and thereby create a fracture the improvement which comprises

using as the fracturing fluid a thickened composition containing colloidal silica.

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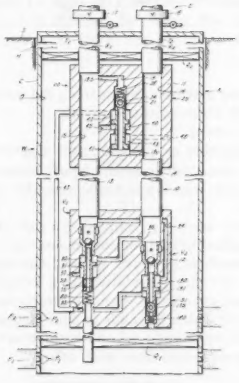
**3,865,191**

## WELL APPARATUS AND METHOD OF OPERATING SAME FOR PERFORMING WELL OPERATIONS

**James D. Mott, Houston, Tex., assignor to Hydril Company, Houston, Tex.**

**Filed May 14, 1973, Ser. No. 360,120**
**Int. Cl. E21b** *43/12*
**U.S. Cl. 166—315** **43 Claims**



**1.** A method of operating a well apparatus having a plurality of flow conductor passages therethrough to establish a desired flow path between the flow conductor passages for performing well operations while protecting the well producing formation from fluid pressure conditions while performing the well operations, including the steps of:

a. increasing the fluid pressure in a first flow conductor passage sensed by the well apparatus;
b. establishing a circulation channel between the first flow conductor passage and a second flow conductor passage for communicating therebetween to provide a desired flow path for well fluids in response to the increased fluid pressure in the first flow conductor passage; and
c. blocking flow through the second flow conductor at a desired location by operation of a plug means in response to the increased fluid pressure in the first flow conductor passage communicated to the plug means separate from the circulation channel while substantially simultaneously establishing the circulation channel wherein a desired circulation flow path for well operations is provided.

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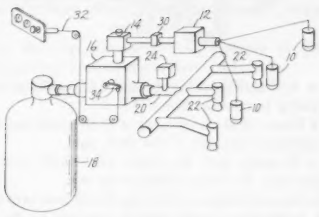
**3,865,192**

## FIRE DETECTION AND EXTINGUISHING SYSTEM

**Matthew J. Dunphy, Braintree, Mass., assignor to Pyrotector, Incorporated, Hingham, Mass.**

**Filed July 19, 1973, Ser. No. 380,848**
**Int. Cl. A62c** *37/06*
**U.S. Cl. 169—61** **6 Claims**



**1.** A fire extinguishing system comprising fire detecting means which produces a signal on detecting a fire supply of extinguishment, extinguishant from said supply releasing means responsive to said signal to release extinguishant, and means detecting the released extinguishant to maintain the extinguishant releasing means in the extinguishant releasing condition.

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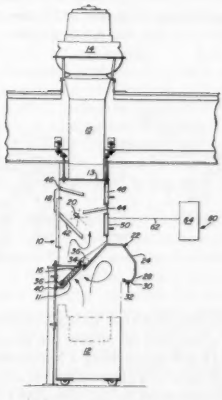
**3,865,193**

## AIR SCRUBBER APPARATUS WITH GREASE REMOVAL MEANS

**Trenton O. Hall, 16480 N.E. 30th Ave., Miami, Fla. 33160**

**Continuation-in-part of Ser. No. 195,170, Nov. 3, 1971, Pat. No. 3,770,061. This application Mar. 21, 1973, Ser. No. 343,495**
**Int. Cl. A62c** *3/00*
**U.S. Cl. 169—65** **12 Claims**



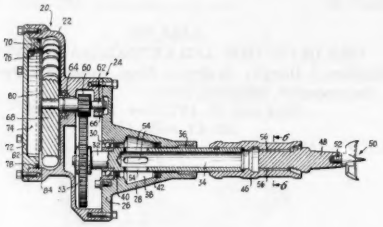
**4.** Apparatus as claimed in claim **1** wherein said disposal means comprises disposable containers connected to said drain means.

**3,865,194**

## HYDRAULICALLY-OPERATED FIRE EXTINGUISHING DRILL

**John F. Chatfield, Jr., 44 Adams Rd., Easton, Conn. 06612**

**Filed Nov. 1, 1973, Ser. No. 412,049**
**Int. Cl. A62c** *31/02*
**U.S. Cl. 169—70** **9 Claims**



1. A fire extinguishing device for buildings and the like, comprising in combination:

a. a rotary drill comprising a shaft part and a cutting bit carried at the end of the shaft part,

b. a housing part in which said shaft part is turnably mounted for rotation about its axis,

c. means providing an inlet for liquid into said housing part,

d. hydraulic impeller means powered by the liquid introduced into the housing part, for driving said shaft part,

e. a collar located at the exterior of the housing part and carried by one of said parts, said collar extending closely adjacent said cutting bit,

f. said collar and said housing part having passages for conducting liquid from the housing part through the collar and discharging the same adjacent said cutting bit, and

g. manually engageable means carried by the housing at the exterior thereof, for enabling it to be grasped by the hands of a user and held in the manner of a power drill, said means including oppositely projecting handle structures on the housing.

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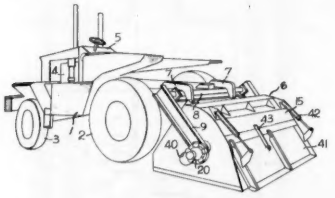
**3,865,195**

## SELF-PROPELLED SOIL STABILIZER MACHINE

**Albert W. Neslon, Springfield, Ohio, assignor to Koehring Company, Milwaukee, Wis.**

**Division of Ser. No. 269,228, July 5, 1972, Pat. No. 3,795,279.**
**This application Sept. 18, 1973, Ser. No. 398,315**
**Int. Cl. A01b** *67/00*
**U.S. Cl. 172—3** **7 Claims**



1. A soil working machine having a chassis on which at least one traction wheel and an engine are mounted and to which a soil stabilizer unit comprising a horizontally disposed vertically movable rotor is connected, first and second hydraulic motor means connected to and operable for driving said traction wheel and said rotor, respectively, first and second hydraulic pumps conntected to and driven by said engine for supplying said first and second motor means, respectively, first and second manually operable adjustable means connected to said first and second hydraulic pumps, respectively, for independently controlling said first and second hydraulic pumps to determine the speed of said first and second motor means, respectively, said second manually operable adjusting means comprising speed range selector valve means connected to between said second hydraulic pump and said second motor means, and control means for sensing load conditions on said rotor and for effecting corresponding changes in the speed of said traction wheel, said control means being connected to said first and second hydraulic pumps and being responsive to pressure conditions in said second pump corresponding to loads imposed on said second motor means to effect flow changes in said first pump to control the speed of said first motor means, said control means effecting speed changes in said first motor means regardless of the adjustment of said first manually operable means which determines the speed of said first motor means.

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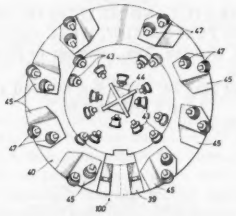
**3,865,196**

## TUNNELING MACHINE HAVING ACCESS PASSAGEWAY AND INVERT CLEANER

**Douglas F. Winberg, Issaquah, Wash., assignor to Subsurface Machine and Manufacturing Inc., Durango, Colo.**

**Division of Ser. No. 234,509, March 14, 1972, Pat. No. 3,776,595. This application Oct. 11, 1973, Ser. No. 405,505**
**Int. Cl. E02f** *5/18*
**U.S. Cl. 172—802** **4 Claims**



1. A scraping assembly for cleaning the invert of a cylindrical channel or excavation comprising:

a. support means;

b. blade assembly mounted on said support means;

c. means connected to said support means for advancing said support means and blade assembly along said channel; and

d. said blade assembly comprising a pair of carriage members attached to said support means and a pair of arcuate blade members mounted on said carriage members for arcuate movement, relative to a cross-section of said cylindrical channel, in opposite directions between a first position in which the ends of said blades are contiguous with each other and a second position in which said blade ends are separated from each other.

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**3,865,197**

## PROTECTIVE CANOPY FOR A PORTABLE DRILLING MACHINE

**Thomas W. McCormick, Morgantown, W. Va., assignor to Mining Equipment Division, a division of FMC Corporation, Fairmount, W. Va.**

**Filed Jan. 29, 1974, Ser. No. 437,660**
**Int. Cl. E21c** *11/02*
**U.S. Cl. 173—23** **14 Claims**

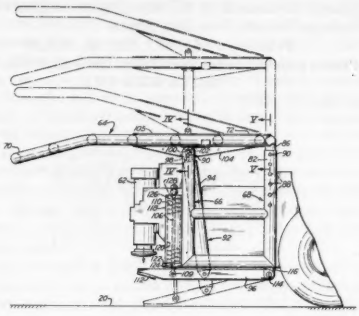
1. The combination of a drill boom and a protective canopy comprising,

a wheeled body portion having a frame,

drill means,

said drill boom positioned forwardly of said wheeled body portion and operable to move said drill means in a vertical plane relative to said frame,

said protective canopy secured to said frame and positioned adjacent said drill boom, said protective canopy having front end and rear end portions arranged for vertical movement relative to said frame and a metal covering



positioned on the top surface of said protective canopy, vertical adjusting means for selectively moving said canopy in a vertical plane relative to said frame,

extensible means for pivoting said canopy front end portion about said canopy rear end portion, and

support means for retaining said extensible means fixed relative to said frame to thereby provide vertical movement of said canopy.

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**3,865,198**

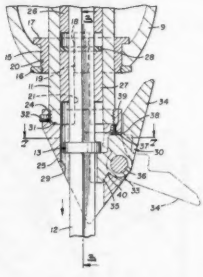
**ADAPTER ASSEMBLY HAVING WEDGE HEAD WITH SADDLE FIT LATCH FOR IMPACT TOOL UNITS**

**Vernon L. Price, 670 Hillcrest Dr., Reno, Nev. 89502**

**Filed Dec. 8, 1972, Ser. No. 313,464**

**Int. Cl. B25d** *17/08*

**U.S. Cl. 173—133** **5 Claims**



**1.** In combination with an impact tool including an impact motor, a support having a socket which opens outwardly and in which a tool bit is axially inwardly inserted, said bit having a shoulder formed thereon, and including:

means for releasably retaining said bit in said socket an for receiving impacts from said impact motor means;

said means comprising a hollow head mounted on said support and having a socket axially aligned with the socket in said support and through which the bit axially extends; said socket having a side opening that extends outwardly through the wall of the socket at a level above the lower end of the head;

a releasable latch member pivoted in said opening by a pivot pin extending transversely thereof above the lower side of the opening;

said latch member having a tool bit shoulder engaging portion inwardly of the pivot pin and an actuating portion outwardly of the pin;

a saddle bearing portion at the lower side of the opening; and

a complemental bearing surface on the latch member at its lower side for engaging said saddle bearing portion, said saddle bearing portion and said complemental bearing surface cooperating to transmit impact and vibrational forces therebetween whereby the forces on said pivot pin are reduced.

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**3,865,199**

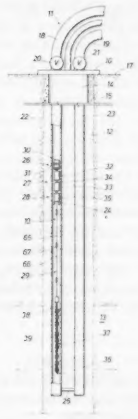
**APPARATUS FOR PERFORATING SUB-SEA WELL BORES**

**Raymond W. Dermott, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Mar. 25, 1974, Ser. No. 454,495**

**Int. Cl. E21b** *43/117*

**U.S. Cl. 175—4.51** **19 Claims**



**5.** Perforating apparatus adapted for movement through multi-curved conduits between the surface and a selected position in a well bore and comprising:

a plurality of elongated metal strips, each of said strips respectively having at least one enlarged opening in an intermediate portion thereof for cooperatively supporting a shaped explosive charge and a reduced opening centrally located in at least one terminal portion thereof and longitudinally spaced away from its transverse end by a predetermined distance which is less than half of its lateral width; and

a plurality of biaxially-pivotal coupling means cooperatively arranged for tandemly intercoupling the overlapped terminal portions of each intercoupled set of said strips, each of said coupling means including a pivot member in said reduced openings for defining a first pivotal axis, said pivot member being sized sufficiently smaller than said reduced openings for allowing said transverse end of either of said overlapped terminal portions to roll on the opposing surface of the other of said overlapped terminal portions about a second pivotal axis extending generally at right angles to said first pivotal axis, and biasing means mounted between said pivot member and one of said overlapped terminal portions normally urging said opposing surfaces into slidable coengagement as said intercoupled strips pivot about said first

pivotal axis and cooperatively arranged for yielding to allow said opposing surfaces to diverge as said intercoupled strips pivot about said second pivotal axis.

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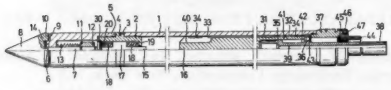
**3,865,200**
**BURROWING APPARATUS**
**Paul Schmidt, Saalhausen, Germany, assignor to Tracto-Technik Paul Schmidt, Saalhausen, Germany**
**Filed Nov. 17, 1972, Ser. No. 307,573**
**Claims priority, application Germany, Nov. 18, 1971, 2157259**
**Int. Cl. E21b *11/02***
**U.S. Cl. 175—19** **23 Claims**



1. Pneumatic burrowing apparatus particularly suitable for earth drilling comprising a tubular housing including a leading end adapted to act as the anterior of said apparatus during a burrowing operation, a percussion tip mounted in said housing at said leading end and including a rearwardly directed portion extending interiorly of said housing, said tip being arranged for axial movement relative to said housing, a percussion piston mounted for reciprocating motion within said housing and arranged to strike said percussion tip to impart a forwardly directed force thereto, pneumatic means including an energy source for imparting a striking force to said piston, spring means mounted between said percussion tip and said housing and arranged to be compressed therebetween upon relative movement of said tip forwardly of said housing, and a displacement cone mounted proximate said leading end for forward movement with said housing during a burrowing operation, said displacement cone being loosely slidable relative to said housing in a direction forwardly thereof.

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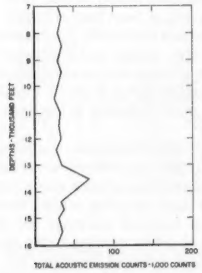
**3,865,201**
**ACOUSTIC EMISSION IN DRILLING WELLS**
**Elard L. Haden, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**
**Filed Jan. 4, 1974, Ser. No. 430,863**
**Int. Cl. E21b *49/00***
**U.S. Cl. 175—50** **5 Claims**




1. A method of drilling a well in a subterranean strata having zones of abnormal formation pressure comprising:
a. momentarily ceasing drilling operations,
b. determining the acoustic emission characteristics of the formation rock in the vicinity of the drill bit,
c. adjusting the weight of the column of drilling fluid when such determination indicates that the drilling fluid pressure and formation pressure are out of balance, and
d. resuming drilling operations.

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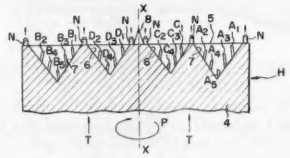
**3,865,202**
**WATER JET DRILL BIT**
**Hikoji Takahashi; Seisuke Misawa; Akinori Takahashi, and Hisashi Yoshimura, all of Tokyo, Japan, assignors to Nippon Kokuyu Tetsudo, Tokyo-to, Japan**
**Filed June 11, 1973, Ser. No. 368,999**
**Claims priority, application Japan, June 15, 1972, 47-59048**
**Int. Cl. E21b *9/35***
**U.S. Cl. 175—393** **5 Claims**



1. An apparatus for excavating a rock comprising an excavating head adapted to rotate about an axis and having a forward face having at least one annular groove formed therein and having a center on said axis, means for rotating the head, means for advancing the head with the forward face thereof confronting the rock, nozzles for ejecting super-high-pressure water jets provided on the inner and outer peripheries of said groove, and a plurality of cutters disposed in said groove at radially different positions with an arrangement such that they are stepwisely retracted relative to the forward face of the head with respect to the advancing direction of the head toward the central part of the width of the groove.

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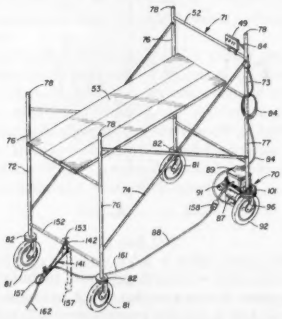
**3,865,203**
**SCAFFOLD DRIVE AND STEERING UNIT**
**James Hibma, Westminster, Colo., assignor to Anne Marie Hibma, Westminster, Colo.**
**Filed Mar. 8, 1973, Ser. No. 339,260**
**Int. Cl. B60k *7/00***
**U.S. Cl. 180—2** **14 Claims**



1. A drive and steering attachment for scaffolding type supports having upright standards that in scaffolding usage may be mateably engaged one above another when multistages are to be used and wherein each of said upright standards are further adapted to receive separate supporting wheel attachments when increased mobility is advantageous comprising a plurality of separable and separate wheel attachments for said support with a wheel attachment for each

upright standard, wheels for each said attachment, frame components for each attachment, wheel axles on said frame components for the rotative support of said wheels, means for separately and selectively engaging each of said wheel attachments with the upright standards of said supports, means facilitating the rotative movement of a first one of said frame components with respect to the vertically disposed axis of its associated upright standard to provide a castor type mounting therefor, an anchor element in non-moving relationship with respect to said associated upright standard, motive drive means interconnecting said anchor element and said first frame component to provide a steerable castor wheel attachment whereby said first frame component and its associated wheel may be rotated to alternate radially directed positions with respect to the axis of its associated upright standard and said support, a mount adjacent said same first frame component and its wheel attachment, a motor drive unit on said mount and interconnected to the wheel of said first frame component and attachment to power rotative movement of said wheel about its axle, and power control apparatus interconnected to said motive drive means and said motor drive unit whereby an operator may conveniently steer and drive said support unit.

**13.** In wheel mounted mobile apparatus to be powered from a fixed electrical power outlet and, accordingly, utilizing a power cord, a power cord guide attachment for use on said mobile apparatus, comprising mounting means for securing said guide attachment to said mobile apparatus for movement therewith, a trailing arm for said guide attachment, a pivot on said mounting means for rotatably holding one end of said trailing arm, a fastener at a free end of said trailing arm for engaging said cord to the trailing arm, an elastic element for biasing said trailing arm to a first trailing position directed away from the wheels of said apparatus with movement away from said first position due to forces applied by said power cord resiliently deforming said elastic element whereby the cord is freed from entrapment by any wheels of said apparatus by the return forces of said elastic element that tend to return the free end of said trailing arm toward said first position and, accordingly, away from any cord entrapping wheel.

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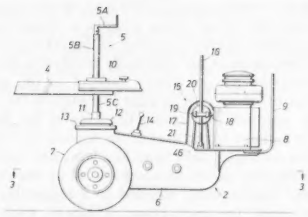
**3,865,204**

## PRIME MOVER FOR TRAILERS AND THE LIKE

**John E. Bueckner, Sr., Houston, Tex. 77002**

**Filed Apr. 5, 1973, Ser. No. 348,122**
**Int. Cl. B62d** *51/06*
**U.S. Cl. 180—12** **10 Claims**



**1.** A self-propelled prime mover for mobilizing a towable vehicle having a draw bar and the like, comprising

a rotatable axle means fixedly interconnecting two spaced-apart wheel members,

chassis means supported at one end on said axle means and having a portion engageable with said vehicle and located above and between said wheel members,

speed reduction means disposed in said chassis means and having a rotatable output drivably connected to said axle means and a rotatable input,

engine means mounted on the other end of said chassis means from said engageable portion and having a mono-directionally rotatable drive shaft, and

clutch means selectively interconnectable between said speed reduction means and said mono-directionally rotatable engine drive shaft for selectively and adjustably rotating said axle means bi-directionally at a selected velocity.

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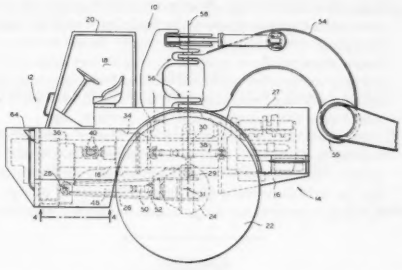
**3,865,205**

## TWO WHEEL TRACTOR

**Allan R. Swanson, St. Joseph, Mich., assignor to Clark Equipment Company, Buchanan, Mich.**

**Continuation of Ser. No. 197,751, Nov. 11, 1971, abandoned. This application June 29, 1973, Ser. No. 375,225**
**Int. Cl. B62d** *49/00*
**U.S. Cl. 180—12** **8 Claims**



**1.** A two-wheeled tractor having a main frame, a drive axle extending transversely of the main frame, a subframe having a pair of suspension arms pivotally connected to the main frame and extending longitudinally beneath the main frame, said drive axle being rigidly supported on the ends of said arms, a pair of suspension cylinders mounted between the subframe and main frame above the centerline of the drive axle retarding oscillatory movement of the axle, an engine mounted on the main frame, a drive line extending from the engine, a transmission having an input shaft connected to the driveline and an output shaft below the main frame, a universal coupling on the output shaft, a second driveline connected to the universal coupling and extending in substantial horizontal alignment with the subframe and connected to the drive axle, the pivot axis of the arms of the subframe coinciding with the transverse axis of the universal coupling about which the drive axle oscillates.

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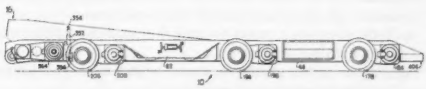
**3,865,206**

## ARTICULATED HAULAGE VEHICLE

**Arthur B. Coval, Columbus, Ohio, assignor to FMC Corporation, Chicago, Ill.**

**Division of Ser. No. 347,645, April 4, 1973, Pat. No. 3,827,721. This application Apr. 16, 1974, Ser. No. 461,274**
**Int. Cl. B60k** *17/30*
**U.S. Cl. 180—24** **12 Claims**



**1.** An articulated haulage vehicle comprising,

a frame member having a front section and a rear section, each of said sections having a front portion and a rear portion,

universal means connecting said frame member front section to said frame member rear section to permit articula-

tion in a plurality of different planes between said frame member front section and said frame member rear section,

a pair of steerable rear wheels mounted on opposite sides of said frame member rear section adjacent the rear portion of said frame member rear section,

a pair of intermediate wheels mounted on opposite sides of said frame member rear section adjacent the front end portion of said frame member front section,

a pair of steerable front wheels mounted on opposite sides of said frame member front section adjacent the front end portion of said frame member front section,

a body member having a floor portion with a pair of side walls extending upwardly therefrom and forming an elongated longitudinal compartment therebetween, said body member front portion having a front edge portion,

said body member mounted on said frame member rear section with said front edge portion spaced rearwardly from said frame rear section front end portion,

a boom member having a floor portion with a pair of spaced side walls extending upwardly therefrom and forming an elongated longitudinal compartment therebetween, said boom member floor portion having a rear edge portion, said boom member mounted on said frame member front section with said rear edge portion spaced forwardly from said frame front section rear end portion, and

flexible plate means connecting said boom member floor rear edge portion to said body member floor front edge portion to permit said boom member and said body member to articulate in a plurality of different planes and forming a continuous longitudinal haulage compartment.

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**3,865,207**

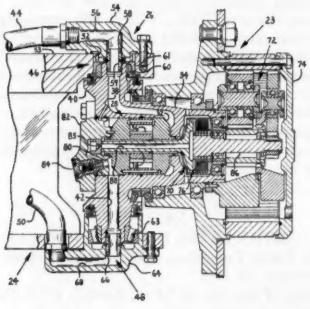
**HYDRAULIC FEED FOR WHEEL MOTORS**

**Delmar G. Schwab, and Dennis P. Graham, both of Milwaukie, Oreg., assignors to Hyster Company, Portland, Oreg.**

**Division of Ser. No. 136,741, April 23, 1971,. This application June 11, 1973, Ser. No. 368,841**

**Int. Cl. B60k** *27/04, 17/30*

**U.S. Cl. 180—44 F** **4 Claims**



**1.** In a vehicle having a main frame, steerable wheel means connected by trunnion means to an axle means for pivoting movement about an axis of said trunnion means,

a hydraulic drive arrangement for said steerable wheel means comprising:

hydraulic motor means mounted within said wheel means for driving said wheel means,

hydraulic pump means on said frame remote from said motor means,

hydraulic fluid passage means interconnecting said pump and motor means,

said fluid passage means including internal passageway means extending within said trunnion means into communication with said motor means, and conduit means extending from said pump means on said frame to said axle means,

coupling means on said axle means interconnecting said conduit means and said internal passageway means in a manner permitting pivoting movement of said trunnion means unrestricted by said conduit means,

said coupling means including a cap member stationarily mounted on said axle means, said cap member including internal passage means in communication with said conduit means, a rigid rotatable sleeve member interconnecting said cap member and said trunnion means, said rigid rotatable sleeve member extending within adjacent end portions of said internal trunnion passage means and said internal cap passage means, said rigid rotatable sleeve member permitting relative rotation between said cap member and said trunnion means and comprising an interconnecting fluid passage between said cap passage means and said trunnion passage means, and said rigid rotatable sleeve member including means providing a fluid seal between said rigid rotatable sleeve member and said cap member and between said rigid rotatable sleeve member and said trunnion means.

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**3,865,208**

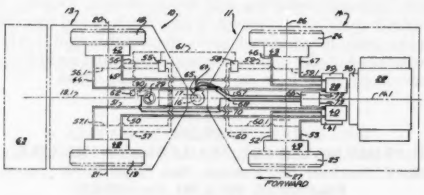
**HYDRAULIC DRIVE APPARATUS FOR WHEELED VEHICLE**

**Richard Crawshay, North Vancouver, British Columbia, and John Helmut Hradil, Delta, British Columbia, both of Canada, assignors to Canadian Mine Services Ltd., Vancouver, British Columbia, Canada**

**Filed May 21, 1973, Ser. No. 362,200**

**Int. Cl. B60k** *17/34*; **B62d** *11/04*

**U.S. Cl. 180—6.48** **16 Claims**



**1.** A positive drive apparatus for a vehicle, the vehicle having: a body supported on a first pair of powered right hand and left hand wheels and a second pair of right hand and left hand wheels, the wheels being adapted to rotate about axes; an engine; means to effect steering of the vehicle by changing angular disposition in an essentially horizontal plane of the axes of the first pair of wheels relative to the axes of the second pair of wheels; for straight line motion the axes being essentially parallel, for turning the axes of the first pair of wheels are inclined to the axes of the second pair of wheels at an articulation angle; right hand and left hand variable delivery hydraulic fluid power means powered by the engine, each fluid power means being coupled to a respective hydraulic motor provided for each powered wheel, each hydraulic power means having a variable output hydraulic flow controlled by a volume flow control means, the flow control means having an input means; the vehicle having a vehicle speed control means having an input means and an output means, the input means being operable by an operator; the positive drive apparatus including:

a. a cam means having output means responsive to the articulation angle subtended by axes of the wheels, the cam means including:

i. right hand and left hand cams related to the right hand and left hand wheels respectively,

ii. right hand and left hand cam followers in engagement with the right hand and left hand cams respectively,

and the output means of the cam means includes:

iii. right hand and left hand cam outputs from right hand and left hand cam followers respectively, each output being dependent on disposition of the cam followers relative to the cam, which disposition is dependent on the articulation angle,

the drive apparatus also including:

b. coupling means operatively connecting the output means of the cam means and the output means of the vehicle speed control means to the input means of the hydraulic power means so as to selectively meter output flow from the hydraulic power means delivered to the powered wheels during a turn, the cam means compensating a demand to the hydraulic fluid power means,

the coupling means including:

iv. a speed input means connected to the output means of the vehicle speed control means, the speed input means receiving a demand for a particular vehicle speed from the operator, the demand resulting in right hand and left hand demand output components which activate the right hand and left hand output means respectively of the vehicle speed control means,

v. right hand and left hand articulation angle input means connected to the right hand and left hand cam output means, disposition of each articulation angle input means resulting in respective articulation angle components which are dependent on the articulation angle,

vi. a compensating means coupling the right hand and left hand output means of the vehicle speed control means with the right hand and left hand articulation angle input means respectively, thus combining both demand output components with respective articulation angle components to produce right hand and left hand output resultants; the compensating means having a right hand and left hand outputs responsive to the respective resultants, the output being connected to the input means of the right hand and left hand hydraulic power means, so that the demand resultant output of the wheel on the inside of the turn is compensated by the articulation angle input means by an amount proportional to the articulation angle,

so that the fluid flow supplied by the hydraulic power means to the wheel on the inside of the turn is less than that supplied to the outside wheel so that relative angular velocity between the inside and the outside wheels is proportional to the articulation angle causing the vehicle to turn with negligible wheel scrubbing.

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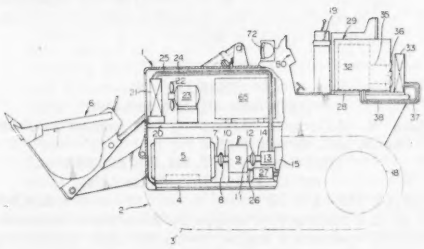
**3,865,209**

## ELECTRICALLY DRIVEN INDUSTRIAL VEHICLES

**Toru Aihara, 2-1-11, Minamidai, Sagamihara-shi, and Kouichi Kimura, 1891, Zama Iriya, Zama-shi, both of Japan**

**Filed July 2, 1973, Ser. No. 375,797**
**Claims priority, application Japan, July 28, 1972, 47-88306**
**Int. Cl. B60l** *15/06, 9/16*
**U.S. Cl. 180—65 R** **2 Claims**



**1.** In an alternating current electrically driven industrial vehicle compatible with both 50- and 60-cycle operations having a drive train and a vehicle transmission, an electric drive comprising:

an electrical induction motor having an output shaft mounted on said vehicle, said induction motor having at least two operable pole configurations;

a secondary transmission operably disposed between said output shaft and the vehicle transmission operable to connect said induction motor to said vehicle transmission at differing gear ratios compatible with both 50- and 60-cycle operation of said induction motor whereby the input to said vehicle transmission will be the same at both 50- and 60-cycle operation of said induction motor;

switching means connected to said induction motor and operable to connect alternate pole configurations of said motor to an alternating power source; and

means connecting said switching means to an alternating electrical power source whereby the speed of the vehicle can be varied both by said vehicle transmission and by selection of at least two different pole configurations of said induction motor, thereby more efficiently adapting the vehicle capability to its working requirements.

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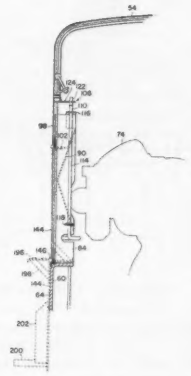
**3,865,210**

## ENGINE COMPARTMENT ACCESS DOOR LATCH SYSTEM

**Cyril William Von Fummetti, and David Dennis, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Apr. 19, 1974, Ser. No. 462,586**
**Int. Cl. B62d** *25/10*
**U.S. Cl. 180—69 R** **8 Claims**



**1.** In an industrial vehicle of a type including a longitudinal frame supported on ground-engaging means, an engine located on the frame and located in an engine compartment bounded at its top by a hood, at one end by a grill housing and at its opposite sides by opposite, longitudinally extending, generally vertically disposed side shield structure, the improvement comprising: at least one of the side shield structures including separate first and second access doors located one adjacent the other between the frame and hood; door support means connected to the vehicle frame and disposed inside said compartment beside said doors; each of said doors being pivotally mounted on said support means for swingable movement between respective closed positions wherein the doors are generally vertically disposed and cooperate with the hood, frame and support means to block access to the compartment, and respective open positions displaced angularly from said operative positions, wherein access is permitted to the compartment for servicing the engine; manually operable first and second latch means connected to the support means and respectively operable for selective latching reception in first and second receptacle means respectively of said first and

second doors for retaining said doors in their closed positions; said first latch means including manually operable security lock means positioned exteriorly of the compartment and operative for preventing removal of said first latch means from said first receptacle means; and said second latch means being located so as to be entirely inside said compartment whereby said security lock means must be unlocked, said second latch must be unlatched and the first door swung to its open position in order to provide access to the second latch means for permitting the unlatching thereof and the opening of the second door.

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**3,865,211**

## STEERING SYSTEM WITH HYDRAULIC POWER ASSISTANCE

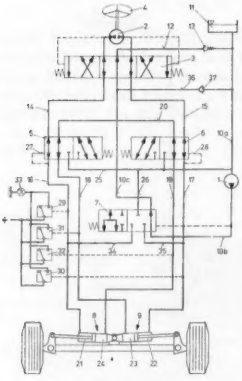
**Karl-Heinz Liebert, Schwabisch Gmund, and Werner Tischer, Unterbobingen, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany**

**Filed Mar. 30, 1973, Ser. No. 346,456**

**Claims priority, application Germany, Mar. 25, 1972, 2214796**

**Int. Cl. B62d** *5/08*

**U.S. Cl. 180—79.2 R** **10 Claims**



**1.** In a hydrostatic power assist steering system for an engine driven vehicle having dirigible wheels, a source of fluid under pressure **1** and **11**, fluid motor means **8** and **9** connected to said wheels for applying steering force thereto, at least two fluid circuits **16–17** and **18–19** connected to said fluid motor means independently of each other, a control valve **3** connected to said source of fluid under pressure, manually operable steering control means **2** and **4** connected to the control valve for selectively supplying pressurized fluid from the source to the fluid motor means through one of the fluid circuits **16–17**, pressure operated valves means **5** and **6** connected between said control valve and the circuits for normally conducting the pressurized fluid through said one of the fluid circuits, and valve actuating means **27** and **28** connected to the pressure operated valve means for connecting the control valve to the other of the fluid circuits **18–19** in response to depressurization of said one of the fluid circuits.

**3,865,212**

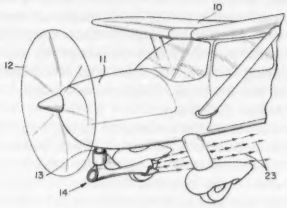
## SURVEILLANCE AIRCRAFT MUFFLER

**Hugh C. McDonald, 8200 Redlands, No. 308, Playa Del Rey, Calif. 90291**

**Filed Dec. 14, 1973, Ser. No. 424,674**

**Int. Cl. F01n** *1/14*

**U.S. Cl. 181—43** **3 Claims**



**1.** A surveillance aircraft muffler wherein the exhaust pipe for the aircraft engine extends downwardly behind the propeller when the aircraft is in level flight, said muffler comprising: an elongated tubular member extending horizontally,

a. one end of the tubular member having an horizontal partition defining on its upper side with the upper wall of the tubular member an exhaust passage which curves smoothly upwardly approximately 90° to terminate in a clamping collar means for affixing said exhaust passage to the downwardly directed end of said exhaust pipe,

b. the lower side of said partition defining with the lower wall of the tubular member an horizontal air scoop passage flaring outwardly to terminate in an air scoop opening below the level of said collar,

c. the central passage of said tubular member at the end of the partition being of reduced diameter, the central passage then increasing in diameter in a direction towards its other end to terminate in a flared outlet opening, the reduced diameter portion of said central passage including:

d. expandable means covering an inner wall portion thereof,

e. means for expanding said expandable means away from the wall portion to vary the effective cross sectional flow area for air and exhaust gases passing through the reduced diameter portion, whereby a venturi section is defined in said tubular member which is adjustable by said expandable means to provide a decreased air pressure at the end of the partition as a consequence of air flow into said air scoop opening so that exhaust gases and noise in said exhaust passage are sucked out of the engine exhaust pipe and directed rearwardly out said outlet opening, and,

f. a curved plate mounted on the lower portion of said outlet opening to define a lip which may be angularly adjusted to direct the outlet flow of gases upwardly at a desired angle with respect to the horizontal so that substantially no sound is directed downwardly towards the earth when said aircraft is in level flight.

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**3,865,213**

## CHAIN SAW OILING SYSTEM

**John W. McDermott, Shreveport, La., assignor to Beaird-Poulan, Inc., Shreveport, La.**

**Filed Oct. 25, 1972, Ser. No. 300,564**

**Int. Cl. F16n** *13/08*; **F01m** *1/04*

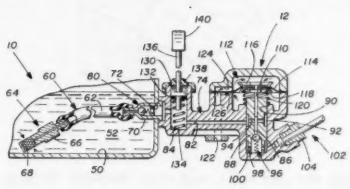
**U.S. Cl. 123—196 CP** **13 Claims**

**10.** In a chain saw of the type including a saw chain and an internal combustion engine driving the chain and having a crankcase for induction and precompression of the fuel mixture, the improvement comprising:

a pump housing having first and second cylinders and an oil passageway formed through the pump housing between

the cylinders and in communication with an oil reservoir and the saw chain,

a first pump having a piston in the first cylinder mounted to reciprocate in the first cylinder in response to cyclical pressure pulses in the crankcase of the engine to continuously pump oil from the oil reservoir to the saw chain and thereby lubricate the chain, and



a second pump having a piston mounted for manual reciprocation in the second cylinder located between the oil reservoir and the first pump in flow communication with the oil passageway, said second pump being selectively actuated to pump oil through the oil passageway and the first cylinder for priming the first pump, for purging foreign matter out of the first pump, and for pumping additional oil to the chain whenever the oil from the first pump is insufficient to properly lubricate the chain.

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**3,865,214**

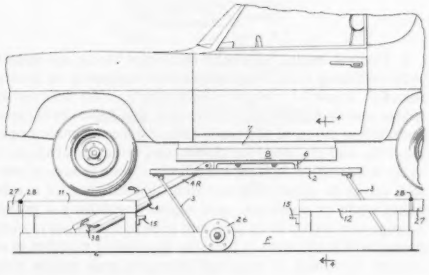
**LIFT MECHANISM FOR AUTOMOBILES**

**Hal J. Clark, 342 N. Greenwood, and Victor S. Wells, Box 542, both of Jackson, Wyo. 83001**

**Filed Jan. 24, 1973, Ser. No. 326,184**

**Int. Cl. B66f 7/06**

**U.S. Cl. 187—8.72** **1 Claim**



1. In an automobile lift assembly:

a supporting rigid framework;

front and rear wheel-supporting ramp means fixed to said framework in a longitudinal orientation at the respective sides thereof and including upwardly-facing surfaces for receiving the respective wheels of a vehicle positioned on said framework, said front and rear wheel supporting ramp means being longitudinally spaced from one another;

a parallelogram-type lift frame movably mounted to said framework within the longitudinal space between said front and rear wheel supporting ramp means, said lift frame including a pair of horizontal lift pads having upper surfaces longitudinally aligned respectively with said ramp means at each side of the framework, each lift pad spanning the longitudinal space between the front and rear ramp means longitudinally aligned therewith;

power-operated means operably connected between the framework and lift frame for selectively moving the lift frame between a lowered position wherein the upper surfaces of each lift pad serves as a bridge spanning the longitudinal space between the front and rear ramp means longitudinally aligned therewith and a raised or elevated position wherein the lift pads are located elevationally above said lowered position an amount sufficient to release the wheels of a vehicle positioned on said framework from contact with said ramp means by lifting engagement of the vehicle between the wheels;

and rigid bench means fixed to said framework beneath said lift frame and intersecting the path of movement of said lift frame for elevationally supporting said lift frame when at said lowered position.

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**3,865,215**

**SPOT-TYPE DISC BRAKE**

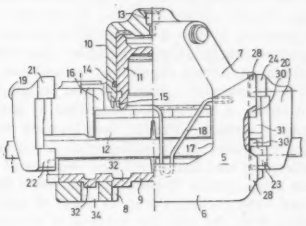
**Jochen Burgdorf, Offenbach, and Roberto Stoka, Frankfurt-/Main, both of Germany, assignors to ITT Industries, Inc., New York, N.Y.**

**Filed June 17, 1974, Ser. No. 480,070**

**Claims priority, application Germany, Aug. 9, 1973, 2340241**

**Int. Cl. F16d 65/00**

**U.S. Cl. 188—73.6** **9 Claims**



1. A spot-type disc brake comprising:

a rotating brake disc having an axis of rotation;

a non-rotating brake carrier protruding over said disc to receive brake torque;

a brake caliper embracing the edge of said disc;

a hydraulical actuating device carried by said caliper;

a pair of brake shoes, one of said shoes being disposed on one side of said disc adjacent said actuating device and actuated thereby and the other of said shoes being disposed on the other side of said disc actuated by said caliper;

a sliding guide connecting said caliper to said carrier in a manner such that said caliper is movable relative to said carrier toward and from said disc, said sliding guide including guide portions which are separated from each other in a direction of the periphery of said disc, said guide portions having grooves in one of said caliper and said carrier and projections engaging said grooves carried by the other of said caliper and said carrier; and

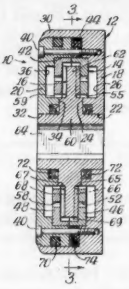
an opening provided in one of said carrier and said caliper through which said one of said shoes can be dismounted without disassembling said caliper and said carrier;

the length of said guide portions being limited to such a value that, when said caliper is shifted into a hollow space formed by dismounting said one of said shoes, said guide portions disengage, thereby enabling a disassembly of said caliper and said carrier.

## 3,865,216
## CONTINUOUS ROTARY DAMPER

**Bogdan R. Gryglas, Woodridge, Ill., assignor to Efdyn Corporation, Chicago, Ill.**

**Filed Oct. 3, 1973, Ser. No. 402,980**
**Int. Cl. F16d** *57/02*
**U.S. Cl. 188—290** **7 Claims**



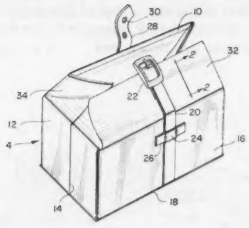
1. A continuous rotary damper comprising: an annular stationary housing unit having a generally U-shaped configuration in cross section, a pair of spaced central annular axial bearing surfaces, a pair of opposed axially inwardly facing annular radial bearing surfaces respecstively adjacent said axial bearing surfaces, a pair of opposed axially inwardly facing annular cavities radially outwardly of said bearing surfaces, and a radially inwardly facing annular recess radially outwardly of said annular cavities; an annular stator unit having a generally U-shaped configuration in cross section, a pair of opposed axially inwardly facing annular radial surfaces in parallel planes, seating engagement in said annular recess, and axial ports communicating with said annular cavities; a rotor unit having a hub portion journaled by said axial and radial bearing surfaces, a radial vane portion with annular radial sides in parallel planes located in close proximity to said radial surfaces of said stator unit, and two sets of radial slots of uniform cross section respectively formed in the opposite sides of said vane portion; the inner edges of said stator unit being spaced from the adjacent portions of said housing unit whereby to define passageway means placing the radially inner ends of said radial slots in communication with said pair of annular cavities; the outer edge of said radial vane being spaced from the adjacent portion of said stator unit whereby to define passageway means placing the radially outer ends of said radial slots in communication; and a fluid substantially filling the space within said housing unit and confined therein for retarding rotation of said rotor unit.

## 3,865,217
## MEN'S TRAVEL KIT

**George Aronek, Los Angeles, Calif., assignor to American Vinyl Products, Los Angeles, Calif.**

**Filed June 13, 1973, Ser. No. 369,603**
**Int. Cl. A45c** *3/00*
**U.S. Cl. 190—48** **3 Claims**

1. A travel kit having a bottom wall member, a pair of opposite sidewall members, a pair of end wall members, a pair of opposite cover members hinged to the upper portions of the sidewall members, a pair of flexible gussets hinged to the upper portions of said end wall members and connected to the sides of said cover members; said sidewall members, end wall members, cover members and gussets formed of two layers of heat sealable vinyl; a cardboard reinforcement between the vinyl layers of said sidewall members, end wall members and cover members; said bottom wall member having a double layer of heat sealable vinyl with a cardboard reinforcement therebetween, four edges of the bottom wall member heat sealed to the bottom of said sidewall and end wall members; and a strap and buckle securing said cover members closed, having the ends heat sealed between said sidewall members and said bottom each sidewall having a pair of parallel horizontal slots in the outer vinyl layer of said sidewalls midway

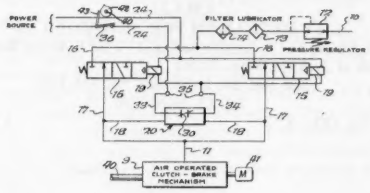


between the end walls, said strap threaded through slots to retain said strap.

## 3,865,218
## DIFFERENTIAL FLOW PRESSURE SWITCH FOR DUAL VALVE CIRCUITS

**Clarence O. Jones, Jr., Eggertsville, N.Y.**

**Continuation-in-part of Ser. No. 192,050, Oct. 26, 1971, abandoned. This application Aug. 16, 1973, Ser. No. 388,894**
**Int. Cl. F15b** *13/44*
**U.S. Cl. 192—12 C** **8 Claims**




1. Control means for cyclic machines having air operated cycle initiating means and a source of operating air pressure therefor, a pair of valves connected in parallel between said source and said cycle initiating means, said valves being jointly operated to energize the cycle-initiating means, means operable at the end of a cycle for closing said valves to terminate the cycle of operation, and means effective upon failure of one of said valves to close for preventing the initiation of a subsequent cycle of operation, said means comprising a pressure passage connected at its opposite ends to the pressure output passages of said valves, a pressure responsive member in said passage including a magnetic element, and switch means controlled by said magnetic element and adapted to be reversed by movement of said pressure responsive member from its neutral position by unbalanced output pressure from said valves, said switch means upon such reversal rendering the machine inoperative to effect subsequent cycles.

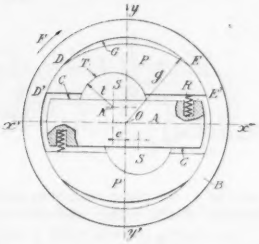
## 3,865,219
## ONE-WAY DRIVE ROTARY COUPLINGS, ESPECIALLY MECHANISMS OF THE FREE WHEEL TYPE

**Michel Dossier, Orgeval, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Nueilly sur Seine, France**

**Filed Feb. 15, 1973, Ser. No. 332,557**
**Claims priority, application France, Feb. 23, 1972, 72.06159**
**Int. Cl. B60l** *5/00*
**U.S. Cl. 192—45.1** **29 Claims**

1. One-way drive rotary coupling of the free-wheel type comprising a central member and a sleeve member, one mem-

ber turning relative to the other around the same axis, intermediate means of the wedge or shoe type arranged between said central and said sleeve member, so as to fix one member rigidly to the other in one of the directions of rotation, said intermediate means being constituted by at least one shoe slidable over a surface of revolution of the sleeve member coaxial to the coupling and a skid inserted in rotary manner



between the shoe and the central member and having a flat surface slidable over a flat surface carried by one of these two elements, the axis of rotation of the skid being suitably displaced with respect to the axial plane normal to said flat surface, at least one spring being also provided to cooperate with the central member and the shoe, to tend to maintain contact between the sliding surfaces.

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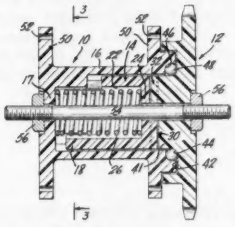
**3,865,220**
**BICYCLE HUB**

**William A. Thompson, Jr., 131 Cranmoor Dr., Toms River, N.J. 08753**

**Filed May 30, 1972, Ser. No. 258,055**
**Int. Cl. F16d** *41/00*
**U.S. Cl. 192—46** **13 Claims**



1. A plastic bicycle hub, comprising:

a housing, formed entirely of plastic, having means for attachment of bicycle spokes;

a sprocket wheel, formed entirely of plastic, mounted at one end of said housing for rotation relative thereto;

one-way torque transmission means, formed entirely of plastic, disposed within said housing and interposed between said housing and said sprocket wheel for transmitting torque of significant magnitude from said sprocket wheel to said housing in only one direction, and allowing said sprocket wheel to rotate freely in the other direction with respect to said housing without transmission of torque of significant magnitude between said housing and said sprocket wheel,

said one-way torque transmission means including an insert member disposed within said housing and formed entirely of plastic;

said insert member being axially shiftable with respect to said housing and said sprocket wheel, and including two-way torque transmitting means formed thereon for providing continuous two-way torque transmitting engagement with one of said housing and said sprocket wheel, whereby said insert member rotates continuously with said one of said housing and said sprocket wheel;

said insert member also including one-way torque transmitting means formed on one axial face of said insert member for transmitting torque in one direction to the other of said housing and said sprocket wheel, and for converting torque in the other direction to an axial force to shift said insert axially out of torque transmitting engagement with said other of said housing and said sprocket wheel; and

said hub further comprising biasing means for biasing said insert directly into torque transmitting engagement with the other of said housing and said sprocket wheel.

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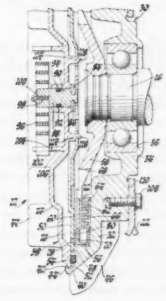
**3,865,221**
**VISCOUS FLUID CLUTCH**

**Donald J. Coty, Kettering, Ohio, assignor to General Motors Corp., Detroit, Mich.**

**Filed Jan. 9, 1974, Ser. No. 431,918**
**Int. Cl. F16d** *35/00;* **B21d** *39/00*
**U.S. Cl. 192—58 B** **4 Claims**



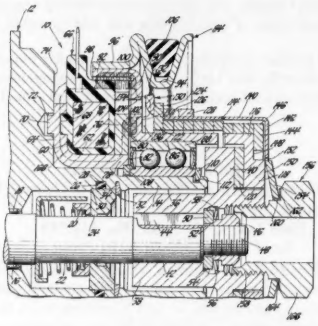
1. A viscous fluid clutch comprising a housing rotatably mounted by bearings on a central shaft, said housing being formed of interconnected body and cover members and having first and second adjacent annular chambers formed therein, a pump plate serving as a divider wall between said first and second chambers, a plurality of closely adjacent notches formed around the inner peripheral edge of said pump plate forming a notched opening therein, a pair of oppositely disposed arcuate-shaped collar-portions formed on said cover member within said notched opening and deformed radially outwardly into mesh with adjacent notches of said notched opening at a predetermined circumferential relationship therewith, a clutch plate mounted on said central shaft in said second chamber, a predetermined shear space intermediate said clutch plate and the adjacent surface of said body member in said first chamber and operable with a fluid medium therein to provide a shear-type fluid drive between said housing and said clutch plate, said pump plate having an outlet opening formed in an outer radial portion thereof and an inlet opening formed at an inner radial portion thereof, pump means formed on said pump plate adjacent said outlet opening to pump said fluid medium from said first chamber through said outlet opening into said second chamber, and a temperature-responsive valve member operatively connected between said cover member and said inlet opening and in a predetermined circumferential relationship with said inlet opening corresponding to said predetermined circumferential relationship between said collar-portions and said notches for controlling the flow of said fluid medium from said second chamber through said inlet opening into said first chamber in response to changes in ambient temperature.

**3,865,222**

## ELECTROMAGNETIC SPRING-WOUND CLUTCH

**John R. Briar, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 8, 1973, Ser. No. 339,199**
**Int. Cl. F16d** *27/10, 7/02*
**U.S. Cl. 192—48.2** **3 Claims**



1. An electromagnetic spring-wound clutch comprising an input pulley assembly including a hub member, a pulley groove portion and a pole member interconnecting said hub member and said pulley groove portion, an output shaft, a hub member mounted on said output shaft, a radial flange formed on an intermediate portion of said output hub member, a friction ring mounted around said output hub member adjacent said radial flange, a driven member mounted around said output hub member adjacent said friction ring, a cylindrical collar formed on said driven member and extending toward said pulley hub member and being axially aligned with said pulley hub member for relative rotation about a common axis, means for frictionally confining said friction ring intermediate said driven member and said radial flange, a stationary coil housing, said pole member being located a predetermined air space apart from said coil housing, an electromagnetic coil mounted in said coil housing, a coil-wound spring mounted around said pulley hub member and said output hub member and having one end thereof secured to said output hub member, and an armature ring member mounted around the other end of said coil-wound spring and movable axially relative thereto, said armature ring member being located a predetermined air space apart from said pole member, said coil when energized drawing said armature ring member axially through said last-mentioned air space into frictional contact with said pole member without axially moving said other end of said coil-wound spring while causing said spring to grippingly engage said pulley hub member and said cylindrical collar to thereby drive said driven member, said friction ring, said output hub member, and said output shaft.

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**3,865,223**

## SAFETY LOCKED BOAT RAISING DEVICE

**Byron L. Godbersen, 710 Circle Dr., Ida Grove, Iowa 51445**

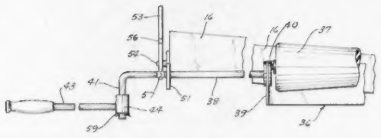
**Filed Aug. 20, 1973, Ser. No. 389,480**
**Int. Cl. B60p** *3/10*
**U.S. Cl. 193—42** **1 Claim**

1. For use with a trailer for carrying a boat or the like, a safety locked boat raising device comprising:

a lift assembly adapted to be mounted at one end of the trailer and having a roller member and a shaft, said roller member being mounted offset relative to its longitudinal axis upon the end of said shaft, said shaft having a perpendicularly formed portion at the end opposite said roller, and said lift assembly being rotatable about its longitudinal axis whereby said roller is moved between a lower first position and a raised second position;

handle means movably attached to said formed portion whereby said assembly is rotatable about its longitudinal axis by operation of said handle means; and

keeper means pivotally attached at one end to the boat trailer and movable to engage said shaft with the other end whereby said assembly is held in locked position against rotation, said shaft including parallel flattened portions for receiving said keeper means, said portions



being parallel to the plane containing said first and second positions of said roller, whereby said shaft is prevented from rotating and said roller is locked in said first or second position by engagement of said keeper means with said shaft, said keeper means including a projection which is engageable by said handle means when said keeper means has locked said roller in said lower first position, whereby said keeper means is locked in engagement with said shaft.

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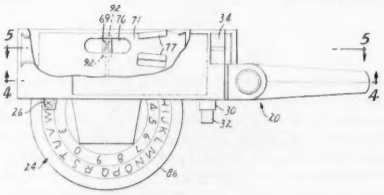
**3,865,224**

## HAND-HELD MULTIPLE-DIE EMBOSSING TOOL

**Michael C. Faust, and Thomas W. Seabold, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Oct. 12, 1973, Ser. No. 406,111**
**Int. Cl. B41j** *1/30*
**U.S. Cl. 197—6.7** **3 Claims**

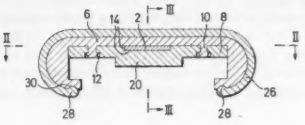


1. A tool for embossing indicia in a wide elongated strip of embossable material, said tool including a body having embossing means at an embossing station, said embossing means comprising two sets of complementary male and female dies said sets being arranged in concentric circular arrays, said female dies being formed on a rotatable disc, said male dies each comprising an element having a plunger with radially spaced ends, said plunger being positioned opposite and mating with an associated female die and having shoulders disposed one adjacent each end of said plunger, said elements being individually mounted on flexible fingers, said embossing means being mounted for movement perpendicular to the direction of travel of said elongated strip so that any selected die of any concentric array of embossing dies may be centered over the elongated strip, feed means for advancing the elongated strip to the embossing station, and a guide plate for carrying said elongated strip between said male and female dies past said embossing station, said guide plate having an aperture to receive said plungers and narrower than the width of said element with said shoulders engaging the guide plate adjacent the edges of said aperture whereby when said dies are in the closed embossing position, the dies, guide plate and elongated strip are pressed firmly together securely holding the edges of the elongated strip.

## 3,865,225
## HANDRAIL FOR ESCALATOR

Karl-Heinz Phal, Leuchtenberger Kirchweg 101, Dusseldorf-Nord, Germany

Filed Jan. 22, 1973, Ser. No. 325,280
Claims priority, application Germany, Jan. 24, 1972, 2203178
Int. Cl. B66b 9/12
U.S. Cl. 198—16 R 15 Claims




1. An endless-loop handrail for an escalator or the like, comprising:

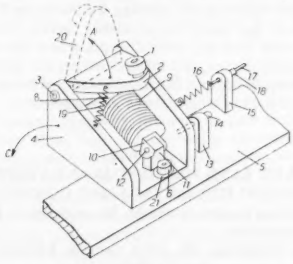
a generally flat, elongated non-articulated member of high tensile strength material forming an endless through pull transmission means and having longitudinally spaced recesses; and

upper and lower sets of segments, encompassing and respectively contacting the opposite flat faces of said transmission means, and having dependent side portions laterally embracing the transmission means, each segment in one set being of material sufficiently resilient to be clamped laterally of said transmission means to a segment in the other set, and the segments in one said set having protrusions mating with said recesses in said transmission means for the transmission of driving force between said segments and said transmission means of the handrail.

## 3,865,226
## SAFETY TIPPING MECHANISM FOR TIPPING TRAYS ON A CONTINUOUS CONVEYOR

Mario Scata, Monzo, Italy, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Nov. 8, 1973, Ser. No. 414,056
Claims priority, application Italy, Nov. 22, 1972, 31937/72
Int. Cl. B65g 47/46
U.S. Cl. 198—38 4 Claims




1. The safety tipping mechanism for a continuous conveyor system of the type having moving tray assemblies comprising:

a base plate;

a support rotatably mounted on said base plate and attached to an upright extension thereon by means of a spring;

a moving lever pivotably mounted to said support;

bearing means attached to the top surface of said moving lever;

a first articulation pivotably attached to a bottom surface of said moving lever;

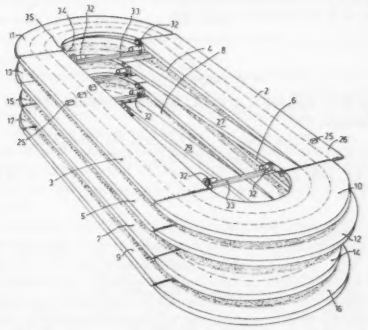
an electromagnet pivotably mounted to said support at one end, and having a slidable core coupled to said first articulation at the other end, said electromagnet is energized to force said moving lever to move from a non-tipping position to a tipping position; and

means for permitting rotation of said tipping mechanism during malfunctioning in order to prevent jamming of said tipping mechanism whereby a predirected force applied to said bearing means causes said support to rotate against the tension of said spring and said support is returned to its rest position when said predirected force is removed.

## 3,865,227
## MULTI-FLOOR CONVEYOR AND STORAGE APPARATUS

Stephanus W. Kaak, Rijksstraatweg 273, Gaanderen, Netherlands

Continuation-in-part of Ser. No. 224,558, Feb. 8, 1972, abandoned. This application Aug. 20, 1973, Ser. No. 389,981
Int. Cl. B65g 37/00
U.S. Cl. 198—84 5 Claims



1. A multi-floor conveyor and storage apparatus for articles having a predetermined width, comprising on each floor level a plurality of communicating conveyors shifted laterally at a junction, all being associated, each having a drive means and the same velocity and arranged in a horizontal plane to form a conveying track for the articles, said communicating conveyors being disposed to convey articles in a laterally changing horizontal path, the conveyors having a width which is a multiple of the width of the articles, each conveyor having two ends abutting adjacent ends of the other conveyors, one of the conveyors having an article receiving end to which the articles are supplied, another one of the conveyors having an article discharge end where the articles are discharged to a vertically descending conveyor for transfer to a subsequent floor level, the one conveyor being displaced perpendicularly to the track in respect of the other conveyor by a distance substantially equal to the width of the articles.

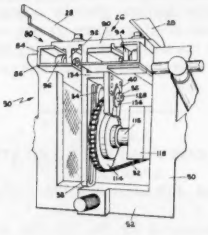
## 3,865,228
## MATERIAL HANDLING DEVICE

Donald L. Hufford, Charlevoix, Mich., assignor to Hufford Industries, Inc., Charlevoix, Mich.

Division of Ser. No. 185,052, Sept. 30, 1971, Pat. No. 3,741,374. This application Mar. 20, 1973, Ser. No. 343,123
Int. Cl. B65g 19/00
U.S. Cl. 198—176 4 Claims

1. A pusher dog assembly mounted to an endless sprocket driven chain for advancing a carriage having a pusher dog holdback means extending to each side of the chain comprising a pair of plates connected to each side of said chain and extending outwardly beyond the chain, said plates including a plurality of arcuately spaced openings for mounting said plates to at least three consecutively linked chain links, said openings adapted to receive portions from each of said three consecutively linked chain links, said plates also including an additional opening spaced outwardly beyond the chain for receipt

of a pin spaced outwardly from each side of said chain and extending transversely to said plates, and a pusher dog mounted to each end of said pin for cooperative driving of said



holdback means alongside said chain, whereby said pusher dog assembly prevents twisting of the chain imparted by the moment force on said assembly and chain by the side engagement with the holdback means.

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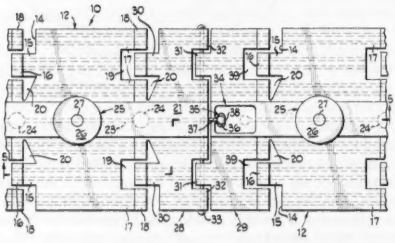
**3,865,229**
**CONVEYOR BELT**
**Hugo W. Velander, Cary, Ill., assignor to Borg-Warner Corp., Chicago, Ill.**
**Filed May 29, 1973, Ser. No. 364,382**
**Int. Cl. B65g** *15/36*
**U.S. Cl. 198—193** **7 Claims**



1. An article-conveying plastic belt comprising:
a plurality of sections connected together;
each section having a plurality of articulated links;
a continuous central strip portion joining the links of each section in serial arrangement;
each link section having a pair of segments separated by said central strip portion;
each of said segments and said central strip portion having an article-supporting surface;
each segment having front and back lugs at the edges thereof;
the lugs of each segment interfitting with the lugs of the next adjacent segment; and
means including a metal cable in said continuous central strip portion drivingly connecting said sections.

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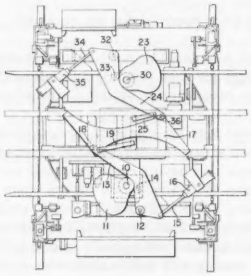
**3,865,230**
**TRANSFER FEEDER**
**Kouiti Nakada, Ishikawa-ken, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo-To, Japan**
**Filed July 9, 1973, Ser. No. 377,293**
**Int. Cl. B65g** *25/04*
**U.S. Cl. 198—218** **2 Claims**

1. The transfer feeder characterized in that a main shaft arranged perpendicularly to the transferring direction of a formed article and extending in a horizontal direction is rotated by a driving means, a driving shaft having a first bevel gear is continuously connected to both ends of the main shaft, a cam-fixing shaft is arranged perpendicularly and vertically to an axial line of the main shaft correspondingly to each driving shaft, a second bevel gear is fixed at the lower end of each cam-fixing shaft and engaged with each first bevel gear, a horizontal plate feeder cam is fixed at the upper end of each cam-fixing shaft, a guide plate is arranged between said horizontal plate feeder cams, a lever is provided swingably in the horizontal plane around a supporting shaft which is disposed correspondingly to each horizontal plate feeder cam, the free end of said lever being movable along the guide plate through a follower provided in each lever, an unloading carrier and a loading carrier are provided respectively so as to cause the advancing motion and the returning motion along a rail on the frame, a rod is respectively connected at its one end to the unloading carrier and the loading carrier and at its other end to each lever, a fork is respectively mounted on the unloading carrier and the loading carrier, a lifter cam is vertically fixed



on the main shaft, a vertically swinging lever supported by a shaft is swung through a follower pivotted to said vertically swinging lever, a long lever is connected at its center portion in the lengthwise direction to the upper end of said vertically swinging lever, a short lever is connected respectively to both ends of the long lever, the base portion of said short lever is fixed to a mounting shaft, a sector gear is fixed to the mounting shaft, a vertical supporting pole having a rack portion is fixed at its upper end to the frame, said rack portion being engaged with said sector gear, whereby the unloading carrier and the loading carrier cause the rectangular cyclic motion in the vertical direction by rotating the main shaft and at the same time by the fork of the unloading carrier, formed articles are taken out from the preceding press and then by the fork of the loading carrier, said formed articles are transferred into the following press, and thus a large ratio of horizontal stroke is obtained for the height of the apparatus.

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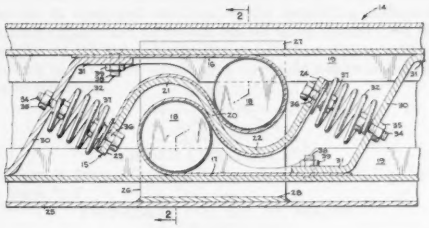
**3,865,231**
**ROLLER BAND MECHANISM AND SUSPENSION SYSTEM FOR OSCILLATING CONVEYORS**
**Ralph Charles Ouska, Hinsdale, Ill., assignor to FMC Corp., San Jose, Calif.**
**Filed Jan. 28, 1974, Ser. No. 437,457**
**Int. Cl. B65g** *27/00*
**U.S. Cl. 198—220 CA** **34 Claims**

1. A mechanism for vibrating a load comprising:
a. a stationary member;
b. a movable member to receive the load;
c. an inclined plane member connected to one of said stationary and movable members, said inclined plane member having two opposite inclined surfaces;
d. a first band connected between said stationary member and said inclined plane member, said first band defining a first loop on one surface of said inclined plane member;
e. a second band connected between said stationary member and said inclined plane member, said second band defining a second loop on the other surface of said inclined plane member;

f. a pair of rollers, each roller being retained within one of the loops in the bands, a portion of each band while wrapped around the roller, making contact with one of



said members and with one of said opposite inclined surfaces to guide the movable member along an inclined path with respect to the stationary member; and

g. means to oscillate said movable member.

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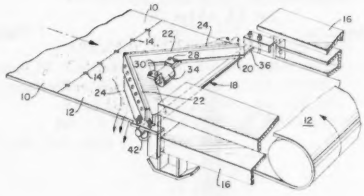
**3,865,232**

**PLOW SCRAPER FOR CONVEYOR BELTS**

**William E. Koenig, Newark, and James T. Cunningham, Caldwell, both of N.J., assignors to Litton Systems, Inc., Passaic, N.J.**

**Filed Sept. 11, 1973, Ser. No. 396,291**
**Int. Cl. B65g** *45/00*
**U.S. Cl. 198—230** **10 Claims**



**1.** In combination, a conveyor belt, a supporting framework situated on opposite sides of the belt and extending parallel thereto, a scraper assembly secured to said framework at opposite sides of the belt and means for advancing the belt relative to the scraper assembly, said assembly comprising:

a. a V-shaped metal frame disposed with its apex extending along the longitudinal center line of the belt and with its sides extending from said apex rearwardly in the direction of belt travel and outwardly towards the sides of the belt;

b. means for mounting said frame for pivotal movement about an axis extending laterally across the belt;

c. resilent scraper blade means secured to said sides of said metal frame and extending therebelow so as to contact the belt surface and skim debris therefrom: and

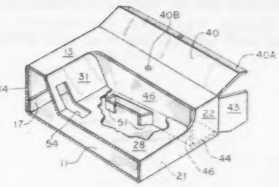
d. roller means secured to said metal frame for pivoting said metal frame downwardly to urge said blade means into contact with the surface of the belt, said roller means extending below bottom edge of said frame but being normally out of contact with the belt surface such that as said scraper blade means wears due to its coaction with the belt surface and any debris that said roller will approach the belt surface and will contact the belt surface before said metal frame does to thus prevent said metal frame from damaging the belt surface.

**3,865,233**

**DISPLAY CARTON WITH PLATFORM SUPPORT**

**John R. Hamlin, Orange, Calif., assignor to Container Corporation of America, Chicago, Ill.**

**Filed Jan. 24, 1974, Ser. No. 436,048**
**Int. Cl. B65d** *5/50*
**U.S. Cl. 206—45.19** **1 Claim**



**1.** A display carton formed from a cut and scored blank of paperboard or the like and comprising:

a. major and minor panels foldably connected to define a tube;

b. one of said minor panels having a width which is less than the width of the other minor panel for a substantial portion of its length and with its ends having a width equal to the other minor panel;

c. one of said major panels having cut lines extending transversely thereof and in alignment with cut lines defining said narrow portion and wider ends of said one minor panel;

d. a fold line in said one major panel connecting inner ends of said cut lines to define a narrow longitudinal panel along one side of said tube;

e. a second fold line in said one major panel spaced from said last named fold line to define a main sub-panel foldably connected to said narrow panel and spaced from said other major panel;

f. closure means for one end of said tube, said closure means extending from an end of said tube including inner and outer closure flaps foldably connected to said major panels;

g. said inner closure flap including foldably connected flap elements;

i. one of said flap elements being folded into facing relationship to said other major panel;

ii. a second of said flap elements being folded perpendicularly to said one flap element and standing between said major panels;

iii. a third of said flap elements being folded into facing relationship with said one major panel;

h. said second flap element having at least one tab element extending from the plane of said second flap element and between said main subpanel and said other major panel to support said main subpanel.

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**3,865,234**

**DISPLAY AND CARRYING PACKAGE FOR FLAT, FLEXIBLE MERCHANDISE**

**Melvin E. Kester, Concord, N.C., assignor to Canon Mills Co., Kannapolis, N.C.**

**Filed Jan. 17, 1973, Ser. No. 324,415**
**Int. Cl. B65d** *65/16, 77/24*
**U.S. Cl. 206—45.33** **1 Claim**

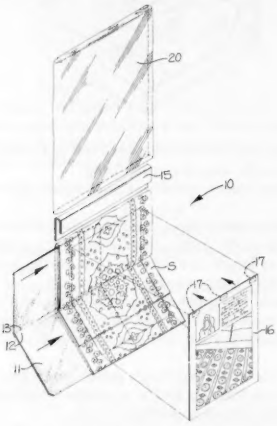
**1.** A display and carrying package for flat, flexible merchandise, such as bed sheets and the like, characterized by a fold-open construction which affords greater area for display of the merchandise and advertising material associated therewith while providing a conventional size package for shelf storage in the folded condition; said package comprising:

flat, flexible merchandise having fold-open dimensions greater than a conventionally desired, shelf size package;

a stiffener comprising a flat, stiff, sheet of material con-

forming generally with the fold-open dimensions of said merchandise and positioned and inserted within said merchandise in the fold-open position thereof to render said merchandise relatively stiff for easy handling, said stiffener including at least one fold line thereacross and generally centrally thereof for folding of said merchandise and said stiffener about said fold line to a folded position in which said merchandise has generally the conventionally desired, shelf size dimensions;

a closed, flexible, transparent bag disposed around and enclosing said merchandise with said stiffener means




therein in the fold-open position thereof forming an enclosed transparent package for display of said merchandise in the fold-open position while folding with said package for shelf storage;

a fold-over sleeve placed around and covering one end of said merchandise; and

a flexible sheet of advertising material positioned on one side of said merchandise and secured at one end thereof to one end of said sleeve for a reciprocating action thereof when said package is folded open to maintain said sheet of advertising in the desired position and alignment.

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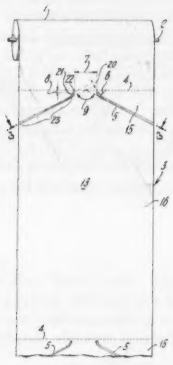
**3,865,235**

## GARMENT-CONTAINING BAGS

**Leonard P. Levy, Valley Stream; Joseph Anthony Kiesel, Kings Park, and Murray H. Honig, Franklin Square, all of N.Y., assignors to Service Poly-Pak, Inc., New York, N.Y.**

**Filed May 8, 1973, Ser. No. 358,585**
**Int. Cl. B65d** *85/18*
**U.S. Cl. 206—286** **5 Claims**

1. A garment-containing bag for use with a garment hanger comprising a continuous tubular sheet of flexible heat-sealable material which may be formed in a flat tubular shape having a front and a rear face terminating at a pair of longitudinal edges, said garment-containing bag including a first end and a second end formed by transverse perforations circumscribing said tubular sheet, and a pair of heat-sealed portions at said first end of said garment-containing bag so as to maintain said front and rear faces in flat adherent contact at said heat-sealed portions, said heat sealed portions including a main shoulder portion and a curved portion, said main shoulder portion including a first end and a second end, and said curved portion including a first end and a second end, said first end of said main shoulder portion joining said first face to said second face at one of said longitudinal edges, and said second end of said main shoulder portion joining said first face to said second face at said first end of said curved portion, said second end of said curved portion joining said first face to said second face at a point spaced from said first end of said garment-containing bag, said second ends of said curved portions of said heat-sealed portions spaced apart so as to provide a central interrupted portion for the insertion of said garment




hanger therebetween, said second end of said curved portions further being displaced from a line extending from said second end of said main shoulder portion to a point dividing said central interrupted portion at said first end of said garment-containing bag.

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**3,865,236**

## NEEDLE SHIELD

**Alan Rycroft, Rutherford, N.J., assignor to Becton, Dickinson and Co., East Rutherford, N.J.**

**Filed Mar. 16, 1973, Ser. No. 342,154**
**Int. Cl. A61m** *5/00*
**U.S. Cl. 206—364** **7 Claims**

1. A needle shield comprising; a tubular member of self-sealing resilient rubber closed at one end and adapted to be positioned in surrounding relationship with respect to a needle so as to normally maintain the needle sealed from the atmosphere, and surfaces in the wall of the tubular member forming an aperture normally closed by the surrounding self-sealing resilient surfaces and the surfaces being adapted to be automatically separated to open the aperture when subjected to predetermined pressure thereby providing communication between the atmosphere and the interior of the member and permitting fluid to pass through the opening and to automatically return to the normally closed position when the predeter-

mined pressure is relieved to reseal the enclosed needle from the atmosphere, the opening being in the form of a slit passing through one side wall of the tubular member intermediate the ends thereof, the needle being mounted to a supporting surface so as to form a needle assembly and the needle shield having its open end mounted on the supporting surface in sealing engagement therewith, the slit being spaced from the portion of the tubular member mounted on the supporting surface so as to form a one-piece combined needle shield and valve structure.

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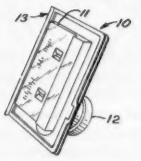
**3,865,237**
**HOLDER CONSTRUCTION**
**Richard R. Isaacs, Chicago, Ill., assignor to Esquire, Inc., New York, N.Y.**
**Filed Apr. 6, 1973, Ser. No. 348,587**
**Int. Cl. G09b** *1/00*
**U.S. Cl. 206—387** **18 Claims**




1. Structure for holding a sound tape container and a cylindrical filmstrip container in an integral assembly for combined storage comprising: wall mans defining a flat selectively closable enclosure for removably housing a sound tape container; and means integrally exteriorly of said wall means for removably securing a cylindrical filmstrip container thereto to project substantially outwardly from the closed enclosure.

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**3,865,238**
**TAPE PROTECTING COVER DEVICE**
**Donald M. Colaluca, Dallas, Tex., assignor to Raymond Lee Organization, New York, N.Y., a part interest**
**Filed Dec. 27, 1973, Ser. No. 428,801**
**Int. Cl. B65d** *85/04, 85/66;* **B65h** *55/00*
**U.S. Cl. 206—404** **3 Claims**

1. A protecting cover device for tape or film on a reel, said cover device comprising

a plurality of housings each comprising slidably mounted telescoping tube sections mounted at one end on the reel and extending in spaced relation substantially perpendicularly to the surface of the reel;

a plurality of springs each in a corresponding one of the housings;

a reel cover for covering the reel mounted on the other end of each of the plurality of housings; and

releasable locking means on the reel cover for releasably locking the springs in compressed condition to lock the cover on the reel whereby when the locking means is in released condition the springs urge the cover away from the reel to release the cover from the reel.

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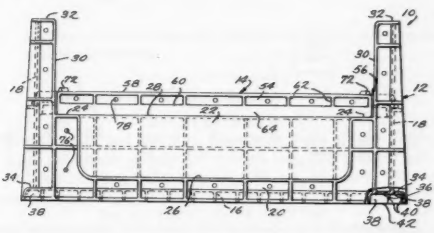
**3,865,239**
**CONTAINER ASSEMBLY**
**Ralph H. Herolzer, Cincinnati, and Joseph Becknell, Hamilton, both of Ohio, assignors to Vanguard Industries, Inc., Cincinnati, Ohio**
**Filed May 8, 1973, Ser. No. 358,331**
**Int. Cl. B65d** *21/00*
**U.S. Cl. 206—507** **13 Claims**




1. A nestable and stackable container for meat and the like comprising a unitary container body molded of plastic material, said container body including a rectangular bottom wall, a pair of opposed end walls extending upwardly from opposite end of said bottom wall, a pair of opposed side walls of a horizontal extent greater than the horizontal extent of said end walls extending upwardly from said bottom wall between said end walls, each of said side walls including a central section of a horizontal extent greater than the horizontal extent of said end walls and a maximum vertical extent generally equal to one-half the vertical extent of said end walls and an end section of a vertical extent generally equal to the vertical extent of said end walls between each end of said central section and the adjacent end of the adjacent end wall, each end wall and the end sections integral therewith including complementary upper and lower stacking parts formed along the upper and lower extremities thereof, said side wall central sections having nesting surface means formed in the upper portions thereof for supporting a like container body disposed in a 90° horizontally rotated orientation in a nested position therein when said container body is empty to a depth permitting said container body to support another like container body in said stacked position thereon above the container body nested therein, the improvement in combination therewith which comprises each upper stacking part being of shallow U-shaped configuration in plan, each lower stacking part including a horizontally extending portion of complementary configuration in plan to the associated upper stacking part disposed in vertical alignment therewith and a pair of continuous elongated wall portions extending downwardly from said horizontally extending portion throughout the horizontal extent thereof, the wall portions of said lower stacking parts providing substantially continuous downwardly facing horizontal surfaces for engaging a horizontal support surface to support said container body thereon, the upper stacking parts providing substantially continuous upwardly facing horizontal surfaces for engaging the downwardly facing horizontal surfaces of the lower stacking parts of a like container body when the latter filled with a supply of meat of the order of 100 pounds is moved into supported relation thereon in a position of slight vertical misalignment so as to enable the like container to be slidingly supported for horizontal movement into an operatively stacked position of vertical alignment wherein the support of the like container is shifted to the horizontal portions of the lower stacking parts thereof and the wall portions thereof are disposed in substantially horizontally surrounding relation to the upper stacking parts of said container body to

thereby prevent substantially horizontal movement of the like container body out of said operative stacked relation.

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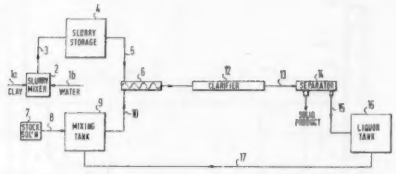
## 3,865,240
## PURIFICATION OF BENTONITE

**Paul Schick, Leutstettener Strasse 49, 8000 Munich 71, Germany**

**Continuation-in-part of Ser. No. 163,614, July 19, 1971, abandoned. This application July 2, 1973, Ser. No. 375,669**
**Claims priority, application Germany, July 21, 1970, 2036152**
**Int. Cl. B03d** *3/00*
**U.S. Cl. 209—5** **8 Claims**




**1.** A method of purifying crude bentonite of accompanying impurities selected from the group consisting of quartz, feldspar, illite, and muscovite, which comprises:

a. mixing one part of said crude bentonite in comminuted condition with about 1.5 to 2.0 parts of water sufficient to form a fluid slurry;

b. introducing said slurry into a much larger amount of a dilute, aqueous solution of a sodium polymetaphosphate of the formula $(NaPO_3)_n$, $n$ being an interger between 2 and 10, the amount of said sodium polymetaphosphate in said solution being at least 0.5% of the weight of said crude bentonite.

1. said slurry being introduced into said solution with agitation sufficient to disperse said crude bentonite uniformly in said solution while avoiding a significant increase in the viscosity of the resulting mixture due to said agitation,

2. the amount of said slurry being sufficient to make the solids content of said resulting mixture between 5% and 30%;

c. permitting the resulting mixture to settle until at least a major portion of said impurities is precipitated, but not substantially longer than 15 minutes, while bentonite enriched with montmorillonite remains suspended in the supernatant liquid;

d. separating the precipitated impurities from the supernatant liquid and the enriched bentonite suspended therein; and

e. collecting the enriched bentonite from the supernatant liquid.

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## 3,865,241
## METHOD AND APPARATUS FOR SEPARATING WOOD BARK FROM GRAVEL

**Gerald W. Crow, 11552 S.W. Lesser Rd., Portland, Oreg. 97219**

**Filed May 21, 1973, Ser. No. 362,376**
**Int. Cl. B07b** *15/00*
**U.S. Cl. 209—11** **13 Claims**

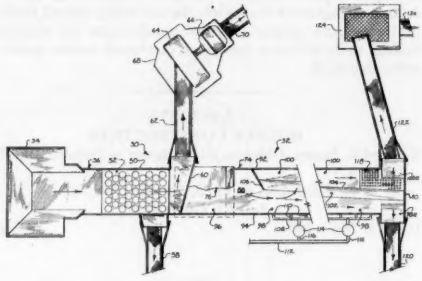
**1.** Apparatus for separating a mixture of dissimilar heavy and light weight materials comprising:

a vibratory conveyor,

said conveyor having an infeed end, an outfeed end, and a floor extending between said ends,

means for vibrating said conveyor in a manner to stratify said mixture to cause the light material to overlie the heavier material and to convey material deposited on said floor from said infeed end to said outfeed end,

said floor being subdivided lengthwise into a heavy material channel and a light material channel by an inclined rampway, said ramway extending at an inclination from said heavy material channel to a ridge separating said channels,



and means for creating a transverse air flow across said heavy material channel toward said inclined rampway to induce a lateral flow of light material from said heavy material channel up said rampway and across said ridge into said light material channel during the vibratory conveyance of said materials lengthwise of said conveyor.

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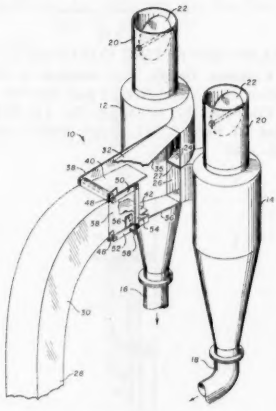
## 3,865,242
## UPSTREAM CLASSIFIER FOR A MULTI-SEPARATOR

**Richard Leopold Musto, Homewood, Ill., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Dec. 15, 1972, Ser. No. 315,688**
**Int. Cl. B07b** *7/086*
**U.S. Cl. 209—143** **7 Claims**



**1.** A method of separating a mixture of fine and coarse solids particles entrained in a fluid stream flowing through a duct for delivery to separate receptacles, comprising the steps of:

a. concentrating the combined fine and coarse solids particles in one region of the stream as a continuous, moving sheet of material;

b. directing said sheet of material toward one of said receptacles;

c. diverting a portion of the fluid from said stream through said region and into the other of said receptacles and passing the remaining portion to said one receptacle while preventing a substantial reduction in the flow veloc-

ity of said flowing fluid whereby the fine solids particles are removed from said sheet of material and delivered to said other receptacle.

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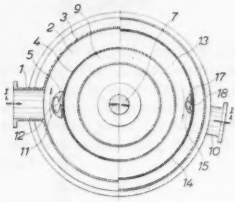
**3,865,243**
**PRESSURE STRAINER DEVICE**

**Rauno Salminen, Valkeakoski, Finland, assignor to Yhtyneet Paperitehtaat Oy Jylhavaara, Valkeakoski, Finland**

**Filed Aug. 30, 1972, Ser. No. 284,867**
**Claims priority, application Finland, June 21, 1972, 1773/72**
**Int. Cl. B07b** *1/00, 1/50*
**U.S. Cl. 209—240** **4 Claims**



**1.** A pressure straining device for a pulp suspension comprising an inlet chamber for pulp to be strained, at least one straining cylinder bounding said inlet chamber and through which acceptable pulp is strained, at least one rotatable vane movable in said inlet chamber proximate the surface of said straining cylinder, said vane having a cavity extending therein, one end of which is closed, said cavity extending along the vane longitudinally and said vane having a slot leading into said cavity and facing said surface of the straining cylinder to admit unstrained pulp collected on said surface into said cavity, a collection chamber having means for isolating itself from said inlet chamber, said cavity of said vane communicating at the other end thereof with said collection chamber for introducing said unstrained pulp thereinto, a secondary straining cylinder concentric with said first screening cylinder, extending outwardly and below said first straining cylinder and forming a separating screen between said collection chamber and said inlet chamber to strain said pulp received from the cavity of said vane, acceptable pulp passing thru said secondary straining cylinder and moving upwardly to said inlet chamber for admixture with the pulp coming thereinto, and at least one secondary rotatable vane movable along the surface of said secondary straining cylinder to clean said surface of the secondary straining cylinder.

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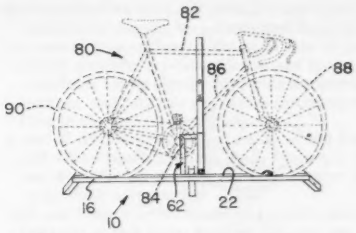
**3,865,244**
**BICYCLE RACK**

**Ralph W. Galen, 131 Mt. Auburn, Cambridge, Mass. 02134, and John A. Vanderpoel, Crescent Rd., Concord, Mass. 01742**

**Filed Oct. 12, 1973, Ser. No. 406,016**
**Int. Cl. E05b** *73/00;* **A47f** *7/04*
**U.S. Cl. 211—5** **17 Claims**

**1.** A device for supporting and holding a bicycle comprising:
channel means for receiving the front and rear wheels of a bicycle;
a support member fixed with respect to said channel means and extending at an angle thereto;
a slide member;
means mounting said slide member to said support member so that said slide member is slidable relative to said support member toward and away from said channel means; and
pivotally mounted clamp means for clamping a portion of the frame of said bicycle to said slide member and for



locking said slide member against movement relative to said support means.

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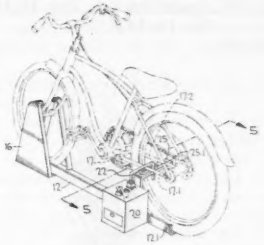
**3,865,245**
**BICYCLE RACK**

**Philip C. Lieb, and David A. Kesselman, both of Mill Valley, Calif., assignors to Rally Enterprises, Inc., Mill Valley, Calif.**

**Continuation-in-part of Ser. No. 230,848, March 1, 1972, abandoned. This application Aug. 28, 1972, Ser. No. 284,107**
**Int. Cl. B62h** *3/00;* **E05b** *73/00*
**U.S. Cl. 211—5** **10 Claims**



**1.** A bicycle rack for receiving and locking a bicycle in place and in an upright position comprising guide means constructed and arranged to receive at least the front wheel of a bicycle and having a vertical extension which extends above the hub of the front wheel of a bicycle when a bicycle is received in said rack, said guide means including means for securing said rack to support means, and lock means secured to said guide means at one side thereof substantially at or to the rear of the bicycle sprocket mechanism, said lock means including engaging means for removably receiving and retaining a structural member of a bicycle and means for locking said engaging means to said structural member, said rack being constructed and arranged to prevent removal or substantial movement of a bicycle when locked in place in said rack.

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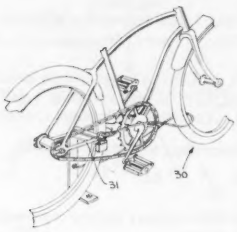
**3,865,246**
**BICYCLE RACKS**

**Philip C. Lieb, and David A. Kesselman, both of Mill Valley, Calif., assignors to Rally Enterprises, Inc., Mill Valley, Calif.**

**Filed Feb. 20, 1973, Ser. No. 333,748**
**Int. Cl. E05b** *73/00*
**U.S. Cl. 211—5** **9 Claims**

**1.** A bicycle rack for receiving and locking bicycles in place and in an upright position comprising an upstanding member having means fixedly securing the same to base means, and horizontal members fixedly secured to and extending from a top portion of said upstanding member at one side thereof, said horizontal members being substantially parallel to each other and overlying each other in an upright direction, said horizontal members being vertically spaced apart a distance sufficient to receive a frame member of a bicycle therein, and

means for securing a padlock simultaneously to free ends of said horizontal members remote from said upstanding mem-



ber, said horizontal members being of a length sufficient to span the width of a bicycle frame.

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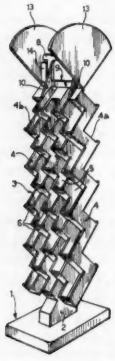
**3,865,247**

**COLUMN-SHAPED DISPLAY DEVICE FOR PARALLELEPIPEDIC ARTICLES**

**Ettore Neglia, San Giorgio Canavese, Italy, assignor to P. Ferrero & C. S.p.A., Alba (Cumeo), Israel**

**Filed July 27, 1973, Ser. No. 383,211**
**Claims priority, application Italy, Dec. 22, 1972, 53879/72**
**Int. Cl. A47f** *5/04, 7/03*
**U.S. Cl. 211—72** **1 Claim**



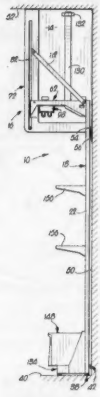
**1.** A display stand comprising a unitary body of plastic material including oppositely base portion and an upright stand portion, said stand portion comprising a plurality of substantially parallel zig-zag strips connected together by transverse partitions which lie substantially parallel to the edges of the strips so as to form two series of pockets, the openings in each series of pockets being directed toward a respective major face of the stand, a vertically disposed upper plate mounted on the top of said stand portion extending transversly of said strips, a pair of circular sector plates and interfitting connecting means for detachably mounting said sector plates on the respective lateral edges of said upper plate so that each sector plate is disposed coplanarly with a respective outer strip, said connecting means comprising a notch in the upper portion of each lateral edge of said upper plate, a pair of oppositedly directed projections extending perpendicular to said plate at the lower portion of each lateral edge of said upper plate and projection means on each of said sector plates being shaped to form a cavity and two lower notches engageable respectively with said notch and said pair of projections situated upon each of the two lateral edges of said upper plate.

**3,865,248**

**WALL MOUNTED DISPLAY SYSTEM**

**Robert W. Donovan, Ridgefield, Conn.; Harvey L. Kolster, Grain Valley, Mo.; Herbert H. Broeker, and George W. Bailey, both of Overland Park, Kans., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.**

**Filed Nov. 12, 1973, Ser. No. 414,640**
**Int. Cl. A47f** *5/08*
**U.S. Cl. 211—90** **17 Claims**



**1.** In article display apparatus for an area having an upright wall surface extending upwardly from the floor thereof to an overhead ceiling, the improved combination comprising:

a pair of upright standards adapted to be located adjacent the wall surface in disposition to be supported by the floor;

at least one tie element adapted to be mounted on the wall surface intermediate the ends of the standards;

means for coupling the standards to the tie element for preventing swinging movement of the standards away from the wall surface;

means mounted on the standards for receiving articles to be displayed; and

a soffit and valance assembly carried by the standards above the article receiving means and including support structure extending forwardly from each standard, upright valance means mounted on the support structure and extending upwardly therefrom toward said ceiling, and soffit defining means carried by the support structures in disposition extending rearwardly from the valance means to a location proximal to the standards.

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**3,865,249**

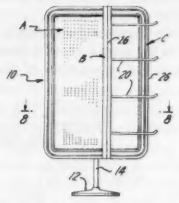
**MERCHANDISE DISPLAYS AND METHOD OF MANUFACTURE**

**Milton W. Herzog, Valley Stream, N.Y., assignor to H. Goodman & Sons, Inc., Kearny, N.J.**

**Filed Dec. 29, 1972, Ser. No. 319,754**
**Int. Cl. A47f** *5/02*
**U.S. Cl. 211—163** **13 Claims**

**1.** A display panel comprising a sheet of thermoplastic material including an article-displaying wall having a pattern of sockets therein, said sockets being defined by respective relatively thick and strong lateral walls extending integrally and essentially erectly from a generally flat area of said sheet and having essentially transverse domes extending integrally from and carried by said lateral walls, there being a narrow transition from the lateral wall to the dome of each socket, said domes being much thinner and weaker than said lateral walls for enabling prongs of article-supporting brackets to be

readily forced through said domes for mounting such brackets at selected locations on said wall which thus constitutes a bracket-supporting wall, the sockets that are free of article-bracket prongs remaining closed by their respective domes.



**10.** A display panel in accordance with claim **9**, having a plurality of said bulges, wherein said member is of sheet-metal having plural holes therein providing edge portions of the member, and wherein at least certain of said integral hollow bulges project through said holes, the bulges being enlarged at the rear of the member to overhang the rear of the member snugly as aforesaid.

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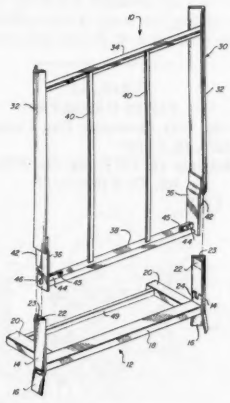
**3,865,250**

## MODULAR STORAGE AND SHIPPING RACK

**Richard S. Jay, Evanston, Ill., assignor to Jarke Corporation, Chicago, Ill.**

**Filed June 26, 1973, Ser. No. 373,883**
**Int. Cl. B65d** *19/12*
**U.S. Cl. 211—177** **8 Claims**



**1.** A modular storage and shipping rack for storing and shipping various articles of manufacture, comprising, in combination:

a rectangular base member,

said base member formed by a series of two pair of corner members, each of said corner members having an open side, one pair of said corner members being disposed such that the open sides of the corner members of said pair are in opposed relation with respect to the remaining pair of corner members,

a pair of end rails, each of said rails being fixedly secured to and extending between one pair of said corner members,

a pair of side rails, each of said side rails, fixedly secured to and extending between said opposed pairs of corner members,

each of said corner members being constructionally sized to provide mounting nests at the top and bottom ends thereof,

the top end of the open side of each of said corner members including restraining means mounted there across,

key means mounted across the open side of each of said corner members positioned below and spaced from said restraining means thereby to provide an open space there between, and with said key means and restraining means lying in the same vertical plane,

a pair of removable rectangular shaped end frames, each end frame consisting of a pair of opposed side frame members, having a top transverse member fixedly secured there between,

each side frame member having an extension plate mounted inwardly of said frame member adjacent the lower end thereof, and extending downwardly therefrom,

said extension plate positioned to rest in close vertically parallel orientation and substantially abuting relation with respect to said restraining means and key means,

a lower transverse member fixedly secured on and extending between opposed extension plates of opposed side frame members,

a plurality of article retaining upright members mounted on and extending between said top transverse member and said lower transverse member,

key mating means mounted on said lower transverse member extending transverse with respect to the plane established by said restraining means and key means and positioned to mate with said key means when said rectangular end frames are mounted on said rectangular base member,

and keeper means mounted on the lower end of each of said side frame members,

said keeper means being dimensionally sized to nest within said top end of said corner member and be held in position by said restraining means such that said keeper means nests entirely within said top end of said corner member permitting each of said side frame members and corresponding corner members to be in abuting relation, whereby said rectangular end frames may be removably mounted on said base member by nesting each of said keeper means within the top end of a corresponding corner member and held in position by said restraining means, while said key mating means is simultaneously mated with said key means to provide additional vertical stability and permit the lower end of each of said side frame members to abut against and form a joint with the top end of the corresponding corner member while said keeper means, restraining means, key means and key mating means are all positioned inwardly with respect to each of said corner members and side frame members.

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**3,865,251**

## SYSTEM AND METHOD FOR BALLOON YARDING AND OTHERWISE TRANSPORTING OBJECTS BETWEEN TWO LOCATIONS

**Frederic E. Langford, Redmond, Wash., assignor to Formac International Inc., Seattle, Wash.**

**Filed Feb. 22, 1974, Ser. No. 444,909**
**Int. Cl. B66c** *21/00*
**U.S. Cl. 212—71** **11 Claims**

**1.** A system for transporting objects between two locations comprising:

a prime mover;

a plurality of drive sheaves and means mounting said drive sheaves for rotation;

first drive means operatively associated with said prime mover for selectively and reversibly rotating said drive sheaves;

a drum and means mounting said drum for rotation;

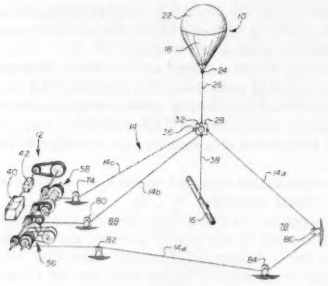
second drive means operatively associated with said prime mover for selectively and reversibly rotating said drum;

a carriage means having means thereon for suspending objects therefrom, said carriage means having a lighter-than-air balloon attached thereto to suspend said carriage means and said objects in the air; said carriage means having an idler sheave mounted for rotation thereon;

an outhaul sheave spaced from said drive sheaves;

cable means connected to said carriage means, said cable means extending from said carriage means and engaging said outhaul sheave, said cable means extending from said outhaul sheave to an engaging said drive sheaves, said cable means extending from said drive sheaves back to said carriage means and engaging said idler sheave, said cable means extending from said idler sheave to and being wrapped on said drum; and,

stop means fixed to said cable means between said drum and said carriage means, said stop means for abutting said carriage means to limit the length of cable which can be payed out from said drum to and through said idler sheave on said carriage means.



7. In a method for transporting objects between two locations using a lighter-than-air balloon, said balloon being attached to a carriage having an idler sheave thereon, said carriage having one end of a cable attached thereto, said cable running through an outhaul sheave fixed in relation to the ground, through a plurality of drive sheaves through an inhaul sheave fixed in relation to the ground and spaced from said outhaul sheave, and through said idler sheave, said cable running from said idler sheave to a drum onto which the other end of said cable is wound, said drive sheaves and said drum each being independently, selectively and reversibly driven by a prime mover, the improvement comprising the steps of:

raising said balloon at a location near said inhaul sheave by stopping said drive sheaves and by paying out cable from said drum through said idler sheave, and

limiting the length of cable which can be payed out from said drum by affixing a stop member to said cable between said drum and said carriage which stop member abuts against said carriage when a predetermined amount of cable has been payed out from said drum.

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**3,865,252**

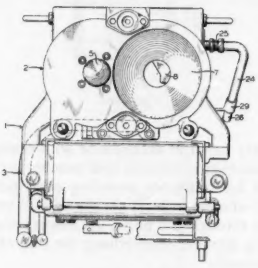
## VISUAL COUPLING INDICATOR FOR AUTOMATIC RAILWAY CAR COUPLERS

**Robert J. Bridigum, Pittsburgh, and Renaldo A. Nebiolo, Irwin, both of Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.**

**Filed Apr. 4, 1974, Ser. No. 457,818**
**Int. Cl. B61g** *3/10*
**U.S. Cl. 213—75 R** **6 Claims**

1. A visual coupling indicator for use with a railway car coupler comprising a casing for a mating head disposed axially parallel to the axis of the car for mating with a counterpart mating head, said casing being of predetermined vertical dimension defined by upper and lower limits and having operably disposed therein a movable locking member biased to a locking position, in which a coupling pin of the counterpart mating head is engaged for locking the mating heads in a coupled relation, and being operable to an unlocking position in which the coupling pin of the counterpart mating head is disengaged for releasing the coupled relation, said visual coupling indicator comprising:

a. a tubular member disposed externally of the casing with one end fixed to the side thereof adjacent to and in alignment with the line of movement of the locking member,



said tubular member being curved such that the other end thereof extends beyond one of the upper and lower limits of the casing; and

b. a flexible indicator member having one end connected to the locking member for movement therewith and extending therefrom through said tubular member, said flexible member being of such length as to be fully retracted within the tubular member when the locking member is in its said locking position, and to have the other end thereof extending exteriorly of said tubular member when the locking member is in its said unlocking position.

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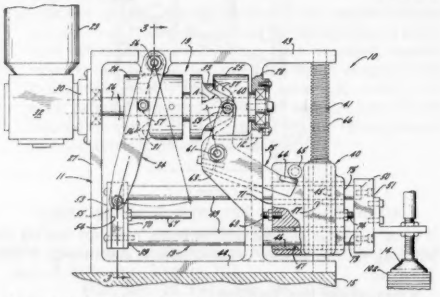
**3,865,253**

## PARTS HANDLER

**Francis L. Healy, C/O Automatic Tool Company P. O. Box 4293, Rockford, Ill. 61110**

**Filed July 12, 1973, Ser. No. 378,407**
**Int. Cl. F16h** *25/12*
**U.S. Cl. 214—1 BT** **5 Claims**



1. A parts handler adapted to pick up, transfer and place a part from a first position into a second position, said handler including a frame, a horizontal arm slidably mounted on said frame for movement both vertically and horizontally along a predetermined path, said arm having an inner end portion and also having an outer end portion which projects from one side of said frame, means on the outer end portion of said arm for picking up and holding said part for movement with said arm along said path from said first position to said second position and for releasing said part at said second position, and means for moving said arm along said path, said means including a guide block secured to said frame for vertical movement

relative thereto, said arm being mounted on said block for vertical movement therewith while still being free to slide horizontally relative to said block, a lift cam rotatably mounted on said frame, a first lever member connected between said lift cam and said guide block to raise the latter on said frame, a stroke cam rotatably mounted on said frame, a second lever member connected between said stroke cam and the inner end of said arm to move the latter horizontally back and forth as the stroke cam is rotated, a common drive shaft journaled on said frame and carrying both of said cams, means for rotating said cams to move said arm along said path so as to pick up, transfer and place a part from said first position into said second position first and second pivotal connections securing said lever members to said frame, and first and second followers mounted on said lever members and positioned to engage said cams, said first member having one end spaced from said first connection a distance greater than the distance between said first connection and said first follower, said second member having one end spaced from said second connection a distance greater than the distance between said second connection and said second follower, the ends of said lever members engaging said slide block and the inner end of said arm, respectively, so that, as said cams are rotated, the vertical and horizontal distances said arm is moved are greater than the horizontal distances said first and second followers are moved by their respective cams.

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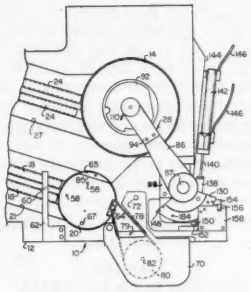
**3,865,254**

## PREALIGNMENT SYSTEM FOR AN OPTICAL ALIGNMENT AND EXPOSURE INSTRUMENT

**Karl-Heinz Johannsmeier, Mountain View, Calif., assignor to Kasker Instruments Inc., Mountain View, Calif.**

**Filed May 21, 1973, Ser. No. 362,447**
**Int. Cl. B65g** *47/24*
**U.S. Cl. 214—1 BH** **26 Claims**



**1.** Apparatus for orienting a workpiece in a selected position, said apparatus comprising:

holder means for holding the workpiece;

drive means for engaging a rounded portion of a peripheral edge of the workpiece to rotate the workpiece in a first rotary direction towards the selected position and, when the workpiece reaches the selected position, for engaging a flat portion of the peripheral edge of the workpiece to maintain the workpiece in the selected position; and

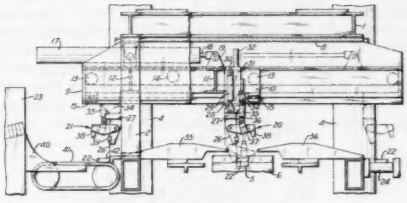
transfer means for transferring the workpiece in the selected position from the holder means to a work station.

**3,865,255**

## BAR HANDLING APPARATUS

**Richard P. Krause, 1503 Highland Ave., New Castle, Pa. 16101**

**Filed Sept. 6, 1973, Ser. No. 394,638**
**Int. Cl. B66c** *1/62*
**U.S. Cl. 214—1 BB** **3 Claims**



**1.** Bar handling apparatus for transferring heating metal bars from a pickup station to rolling and discharge stations in succession, said stations being spaced apart uniformly, said apparatus comprising a pair of horizontally spaced grippers, one of said grippers being a leading gripper and the other a trialing gripper, means for moving the grippers forward together from a first position to a second position in which the trailing gripper takes the place formerly occupied by the leading gripper, means for lowering the grippers at the first position so that they may grip the central portion of an underlying bar at the pickup and rolling stations respectively, means for raising the grippers with the bars gripped thereby, laterally spaced skids disposed between the first and second positions for supporting the ends of a heated bar carried by said trailing gripper to said second position, said grippers also being movable downwardly at said second position, means for releasing the lowered grippers from the gripped bars at the second position to deposit bars at the rolling and discharge stations respectively, and means for returning the released grippers to said first position after they have been raised at the second position.

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**3,865,256**

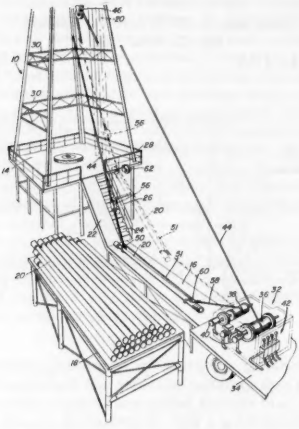
## CASING AND DRILL PIPE HANDLING DEVICE

**Richard B. Freeman, Sr., 1230 W. Main St., Hojma, La. 70360**

**Filed Nov. 8, 1973, Ser. No. 414,137**
**Int. Cl. E21b** *19/02*
**U.S. Cl. 214—2.5** **11 Claims**

**1.** A pipe or casing handling device for use in combination with an on-site well rig including a derrick provided with a rig floor, girths, a monkey board in elevated relation to the floor and a catwalk extending outwardly from the derrick alongside a pipe rack, said device comprising a drawworks including two independently operated winch drums, each of said winch drums including a cable thereon, the cable from one winch drum extending to an elevated position in the derrick, a cable block secured in elevated position in the derrick, adjacent the monkey board, receiving the cable thereover, the cable from the cable block then extending downwardly and provided with means on the terminal end thereof for releasable connection with one end of a section of pipe, the cable on the other winch drum being in the form of a tag line extending directly to and including a terminal end means detachably connected to the other end of the section of pipe whereby the section of pipe, by manipulating the winch drums, may be moved between a vertical position within the derrick and a horizontal position on the catwalk without the lower end of the pipe dragging along the surface of the catwalk or rig floor, said cable block being suspended from girths in the derrick by flexible cable means to enable the cable block to be positioned out of the way when not in use, the terminal end portion of the cable

entrained over the cable block including a weight to assure that the terminal end portion of the cable will be moved to a



lowered position for connection with the end of a section of pipe oriented on the catwalk.

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**3,865,257**

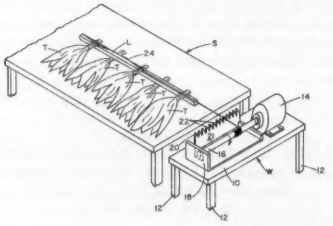
**METHOD AND APPARATUS FOR DESTRINGING TOBACCO**

**Douglas A. Slate, Route 4, Box 320, Kernersville, N.C. 27284**

**Filed Jan. 3, 1974, Ser. No. 430,471**

**Int. Cl. A24b** *1/06*

**U.S. Cl. 214—5.5** **4 Claims**



**1.** Apparatus for destringing tobacco laths of a type wherein tobacco leaves are gathered in several hands and attached together by means of a continuous cord, each hand being wrapped by a section of said cord, tied in a release knot with adjacent hands draped on opposite sides of said lath, and connected by a length of said cord draped across said lath, and whereby said release knot may be released when a force is exerted on said cord along a prescribed release path, the apparatus comprising a rotatable winding means positioned in said release path with the axis of rotation of said winding means lying generally perpendicular to said release path, and whereby the speed of rotation and surface friction of said winding means cooperate to entrain said cord on said winding means, exert said force along said prescribed path, and accumulate said cord as it is removed.

**4.** A method for destringing tobacco laths of a type wherein tobacco leaves are gathered in several hands and attached together by means of a continuous cord, each hand being wrapped by a section of said cord tied in a release knot with adjacent hands draped on opposite sides of said lath and connected by a length of said cord draped across said lath, and a knot in the cord at the end of the hands, and whereby said release knots may be released when a force is exerted on said cord along a prescribed release path, the method comprising the steps of:

A. positioning the tobacco lath and leaves on a work surface with the tobacco lath extending along said prescribed release path;

B. cutting the knot at one end of the several hands;

C. manually exerting a force along said prescribed path to release a sufficient number of release knots to provide a length of cord; and

D. dropping the length of cord onto a rotating shaft which releases the remainder of the release knots and pulls the cord completely from the lath.

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**3,865,258**

**CONVEYING AND STACKING SYSTEM FOR ARTICLES**

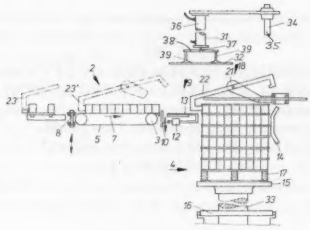
**Friedhelm Muller, Dortmund-Wickede, Germany, assignor to Holstein & Kappert Machinenfabrik Phonix GmbH, Dortmund, Germany**

**Filed Mar. 7, 1973, Ser. No. 338,971**

**Claims priority, application Germany, Mar. 11, 1972, 2211793**

**Int. Cl. B65g** *57/10, 59/02*

**U.S. Cl. 214—6 H** **7 Claims**



**1.** A conveying system, comprising first means for conveying articles in a path; second means laterally spaced from said path and operative for raising and lowering of articles to and from the level of said path; third means intermediate said first and second means for assembling batches of articles which are to be transferred to one of said first and second means; and fourth means for transferring articles said first, second and third means, said fourth means comprising an arm pivotable about a horizontal axis above said level and having spaced ends each provided with an engaging portion respectively adapted in dependence upon pivoting of said arm to move behind respective articles to be transferred at a side thereof which is opposite the direction of transfer, and moving means for moving said arm with reference to said first, second and third means so as to effect transfer of the engaged articlles.

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**3,865,259**

**SILO FOR BULK MATERIAL**

**Eberhard Stodt, Dusseldorf, Germany, assignor to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany**

**Filed Nov. 8, 1972, Ser. No. 304,635**

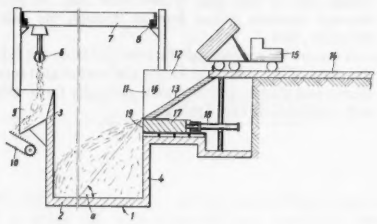
**Claims priority, application Germany, Oct. 23, 1972, 2246877**

**Int. Cl. B65g** *65/32*

**U.S. Cl. 214—17 C** **7 Claims**

**1.** A silo for processing bulk material comprising, in combination, a chamber having a storage volume defined by a plurality of upstanding side walls and a bottom, said side walls being configured to define said chamber with a substantial height dimension extending upwardly from said bottom within which said bulk material may be deposited, a charging inlet located in one of said side walls at the upper end of said chamber for introducing therethrough bulk material into said

chamber, said charging inlet being spaced upwardly a substantial distance from said bottom in order to define between said bottom and said inlet substantially the entire volume of said chamber within which bulk material is contained, a charging edge located in the plane of said one side wall defining the lowermost limits of said charging inlet and extending substantially horizontally across said one side wall, pusher means having a length dimension extending generally pependicularly to said one side wall and a cross sectional configuration lying in a plane extending generally parallel to said one side wall, said cross sectional configuration extending substantially uniformly throughout the major portion of the length of said pusher means, guideway means located immediately below said charging edge contiguously thereto and extending from an opening located in said one side wall in a direction perpendicularly thereto outwardly from said chamber, said guideway



means in said opening having a cross sectional configuration conforming substantially with said cross sectional configuration of said pusher means and being structured to have said pusher means guided therein for longitudinal movement generally perpendicularly to said one side wall into and away from the upper portions of said chamber, said guideway means and said pusher means being configured to extend for only a short distance downwardly of said charging edge taken relative to the overall length of said one side wall, with said opening of said guideway means substantially enclosing said pusher means about its periphery throughout substantially the entire length of the stroke of said pusher means, whereby bulk material accumulating at the top of said chamber may be distributed therein by operation of said pusher means without creating undesired openings in the walls of said chamber through which bulk material might inadvertently escape.

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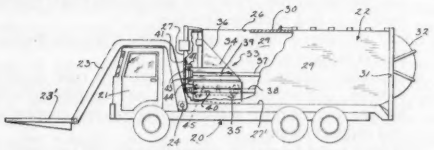
**3,865,260**

**REFUSE BODY WITH TWO-PART PACKER-EJECTOR PLATEN**

**John E. Wieschel, Hartland; Jerald G. Zanzig, Brookfield, and Thomas F. Petrykowski, Racine, all of Wis., assignors to The Heil Co., Milwaukee, Wis.**

**Filed Aug. 24, 1973, Ser. No. 391,193**
**Int. Cl. B60p *1/00***
**U.S. Cl. 214—82** **10 Claims**



**2.** In a refuse vehicle having a cab and a body within which refuse is adapted to be compacted, said body having a front end wall adjacent the rear of the cab, having a rear opening, and having a door for releasably closing said rear opening, the improvement comprising a two-part packer ejector platen mounted for movement longitudinally in said body and having an upper part with a rearwardly-facing refuse-guiding portion for guiding refuse which is falling by gravity and having a lower packer part, means for releasably maintaining said upper part in fixed position adjacent said front wall of the body near the cab, there being a refuse-receiving opening adjacent the front of the body so positioned that refuse is deposited adjacent said packer ejector platen while it is in said front location with some of the deposited refuse being guided by the refuse-guiding portion of the upper platen part, said lower packer part, when in its front position, being located so that said guided refuse is guided into a position to be acted upon by said lower platen part, power-operated means for causing reciprocable packing movement of said lower packer part to compact said deposited refuse rearwardly in the body while the upper part remains in said fixed position adjacent the cab, and means for selectively causing conjoint ejecting movement of said two platen parts toward the rear while the rearwardly-facing end of the lower packer part is substantially below the rear of the upper platen part.

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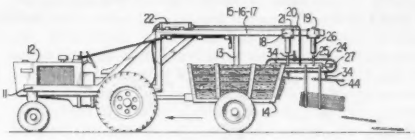
**3,865,261**

**CANE PLANTER RAKE PLATE**

**Raynold Usie, P.O. Box 871, Houma, La. 70360**

**Filed Apr. 20, 1973, Ser. No. 352,951**
**Int. Cl. B60p *1/00***
**U.S. Cl. 214—83.26** **1 Claim**



**1.** A sugar cane planter having a propelled vehicular frame for carrying a plurality of horizontally disposed sugar cane seed stalks for deposit horizontally rearwardly of the vehicle frame upon the ground, a planter comprising an endless conveyor positioned above said horizontally disposed cane stalks, a plurality of planter rake plates secured to the endless conveyor with the major length of the plates directed toward the cane stalks, and a plurality of wedge-like cane stalk engaging means having a plurality of V-notches transversely of the free end of the plate, positioned to grasp a cane stalk proximate its eye for moving the stalk rearwardly of the vehicle for deposit by free fall from said wedge-like engaging means from the conveyor to the ground.

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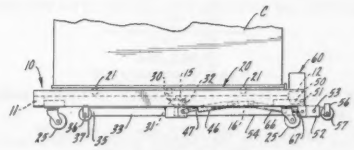
**3,865,262**

**MATERIAL HANDLING METHOD AND APPARATUS**

**Raymond E. Smith, Jr., 385 Greenwood Ave, Lake Forest, Ill. 60045**

**Filed Mar. 12, 1973, Ser. No. 340,343**
**Int. Cl. B60p *1/64***
**U.S. Cl. 214—152** **5 Claims**



**1.** Apparatus for raising a body of material from a lower surface onto an upper surface or lowering a body of material from an upper surface onto a lower surface, comprising:

a. normally horizontal sled means,

b. said sled means having a front end supported on anti-friction means and a back end supported on anti-friction means,

c. deck means on said sled means for supporting a body of material,
d. means for fastening the body to said deck means,
e. leg means pivotally connected to said deck means underneath said deck means and having free end means horizontally displaced from any connection to said sled means,
f. said free end means having anti-friction means thereon,
g. said leg means comprising at least a front lift leg and a relatively longer back lift leg with the pivotal connection between said front lift leg and said sled means being disposed substantially mid-way between the front and back ends of said sled means, and
h. power means between said deck means and said leg means and effective upon actuation to pivot said leg means to raise or lower said deck means.

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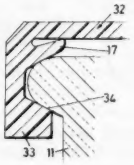
**3,865,263**
**CLOSURE CAP**
**Ralph William Birch, Rustington, England, assignor to U.M.P. Plastics Ltd., Lancashire, England**
**Continuation-in-part of Ser. No. 140,353, May 5, 1971, Pat. No. 3,784,041. This application Oct. 10, 1973, Ser. No. 405,083**
**Int. Cl. B65d** *41/04, 41/18*
**U.S. Cl. 215—321** **6 Claims**




1. A closure cap adapted to seal the neck of a container, the closure cap being formed of a moulding of elastomeric material and having a top portion, an annular skirt which extends from the periphery of the top portion, an abutment portion of said skirt which is adapted firmly to engage said neck to releasably retain the closure cap thereon, and an annular resilient flange portion which extends from and radially inwardly of the skirt and which is spaced from the internal surface of the said top portion by an annular groove, the resilient flange portion having a surface, at least partly convexly curved, which is remote from the top portion and which, even when the resilient flange portion is undeformed, is radially inwardly inclined towards the top portion, the resilient flange portion, when the cap is fitted to the container, effecting a primary sealing engagement with a radially outer edge of the end portion of the neck and a secondary engagement with the top surface of the end portion of the neck, and the resilient flange portion being deflectable into engagement with the internal surface of the top portion to trap a pocket of air therebetween.

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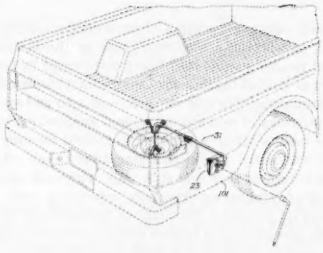
**3,865,264**
**SPARE TIRE MOUNT**
**John P. Kuhns, Hurst, Tex., assignor to Caddie Industries, Inc., Fort Worth, Tex.**
**Filed Oct. 10, 1972, Ser. No. 296,029**
**Int. Cl. B62d** *43/04*
**U.S. Cl. 214—451** **8 Claims**

1. A device for mounting a spare tire to the underside of a motor vehicle, comprising:
winch means including a rotatable means adapted to be attached to a motor vehicle,
a flexible cable having a first end attached to said rotatable means of said winch means and a second end adapted to be releasably coupled to a tire,
support means adapted to be attached to the underside of the motor vehicle for supporting said cable and the spare tire,
said rotatable means being operable upon rotations in a first direction to wind the cable to raise the spare tire upward to and elevated storage position,
said rotatable meand being capable of rotation in an opposite direction to allow the cable to unwind to lower the spare tire,
said rotatable means of said winch means being supported by a housing,
said housing having a face beyond which extend an end of said rotatable means and an end of said lock,
said housing being adapted to be attached to the inside surface of the side wall structure of the vehicle in a manner to locate the face of said housing close to said inside surface such thet access to said end of said rotatable means and to said end of said lock may be provided through opening means formed through the side wall structure, and
spacer means for spacing said face inward from the side wall structure of the vehicle to locate said end of said rotatable means and said end of said lock generally flush with said wall structure of said vehicle,

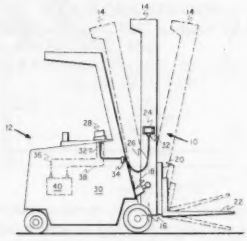


a ratchet wheel secured to said rotatable means for rotation therewith,
a pawl operatively associated with said ratchet wheel and normally positioned to allow rotation of said ratchet wheel and said rotatable means in said first direction but to prevent said ratchet wheel and said rotatable means for rotating in said opposite direction, and
a lock having a bolt operable by a key for moving said pawl to a position ineffective to hold said ratchet wheel against rotation in said opposite direction,
a load carrying conduit means extending from said housing to said support means,
said conduit means comprising at least two rigid conduit sections, one section having one end coupled to said housing and the other section having one end coupled to said support means,
said cable being located to extend through said two conduit sections from said housing to said support means,
said ends of said sections being coupled to said housing and to said support means in a manner to allow said housing and said support means to be turned to different positions relative to their associated sections, and
sleeve means for rigidly coupling together the other ends of said conduit sections at different positions relative to each other for adjustment purposes.

## 3,865,265
## LIFT TRUCK SAFETY ACCESSORY

Ronald A. Brudi; Randall W. Matthewson, both of Longview, Wash., and Randall P. Wheeler, Rainier, Oreg., assignors to Brudi Equipment, Inc., Longview, Wash.

Filed Aug. 20, 1973, Ser. No. 389,696
Int. Cl. B66f 9/20
U.S. Cl. 214—674 18 Claims

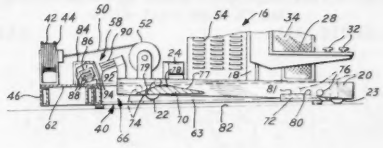


1. In a lift truck of the type having a load lifting mast tiltable about a tilting axis both forwardly and rearwardly from a vertical position, power means for movable tilting said mast, and a load carriage mounted for vertical reciprocation on said mast, a safety accessory comprising: a housing; gravity sensing tilt indicator means mounted within said housing for sensing the degree of tilt of said housing in a predetermined tilting plane, said tilt indicator means including electrically powered means for generating a variable signal corresponding to said degree of tilt of said housing, and also corresponding to the direction of tilt of said housing in either direction from a predetermined null position of said housing; mounting means adapted for rigidly mounting said housing to said lift truck mast in such a position that said predetermined tilting plane of said housing is perpendicular to said tilting axis of said mast; adjustment means assocaited with said housing for permitting said null position of said housing to be adjusted with respect to said mast to achieve correspondence between said predetermined null position of said housing and said vertical position of said mast; tilt display means adapted for mounting on the main body of said lift truck for receiving said signals generated by said tilt indicator means and providing visual indicia of both direction and degree of tilt of said housing in either direction from said predetermined null position in response to said signals; a flexible conduit coupled with said tilt indicator means and adapted to extend therefrom to said tilt display means, said conduit including signal transmission means for transmitting said signals generated by said tilt indicator means to said tilt display means and further including means for conducting electrical current from said lift truck to said tilt indicator means to generate said signals, said conduit having sufficient excess length to permit it to compensate for the tilting movement of said mast relative to said main body of said lift truck regardless of the tilting position of said mast; said gravity sensing tilt indicator means comprising an electrolytic transducer and an associated bridge circuit and said tilt display means comprising a direct current meter capable of sensing polarity and normally biased to a center position shunted across said bridge circuit, said accessory further comprising means for tapping the direct current electrical power source of said lift truck and converting said electrical power to alternating current having a positive and negative half-cycle for powering said electrolytic transducer and bridge circuit; and a rectification circuit interposed between said transducer and said meter for providing a direct current signal to said meter.

## 3,865,266
## LOAD CARRIER TRANSFER

Paul E. Redelman, South Holland, Ill., assignor to Interlake, Inc., Chicago, Ill.

Filed Feb. 28, 1973, Ser. No. 336,886
Int. Cl. B60p 1/64
U.S. Cl. 214—515 7 Claims



1. In a multivehicle arrangement including a first vehicle and a second vehicle adapted to transport the first vehicle, comprising

fixed inclined support means on one of said vehicles, and

movable support means on the other of said vehicles positioned to engage said fixed inclined support means as said first vehicle is being positioned on said second vehicle for transport by the latter, said fixed inclined support means including a pair of support ramps longitudinally spaced from each other, one of said support ramps including a pair of reversely inclined surfaces and the other of said support ramps including at least one inclined surface, and said movable support means including a pair of rollers spaced from each other by a distance such that as one of said rollers moves in a given direction on one of the inclined surfaces of said one of said ramps, the other of said rollers moves in a direction opposite said given direction on the inclined surface of the other of said support ramps to assist said other roller's movement in said opposite direction on said other of said ramps and assist in the elevation of one end of said first vehicle once the other end of said vehicle has been elevated.

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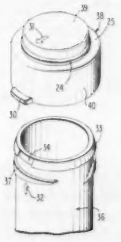
## 3,865,267
## CHILD-PROOF AND PHARMACIST-ASSISTING REVERSIBLE CLOSURE FOR CONTAINERS

Glenn H. Morris, 4203 Highwood Dr., Chattanooga, Tenn. 37415

Filed Dec. 20, 1973, Ser. No. 426,534
Int. Cl. B65d 55/02, 85/56; A61j 1/00
U.S. Cl. 215—206 17 Claims



17. A reversible closure having two positions of use on a container comprising a first coupling part on said closure adapted to engage a container in one use position of the closure wherein the closure protects the interior of the container from contamination, the first coupling part separating from the container by application thereto of a simple force, and a second coupling part on the closure having positive interlocking engagement with the container in the second position of use of the closure on the container, the second coupling part

being releasable from the container only following a compound movement thereto relative to the container.

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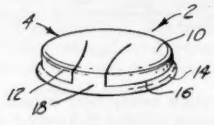
**3,865,268**
**TEAR-OFF CAP CLOSURE**
**Jack A. Coop, 141 N. 24th St., New Castle, Ind. 47362**
**Filed Aug. 20, 1973, Ser. No. 390,095**
**Int. Cl. B65d** *41/32, 41/10*
**U.S. Cl. 215—253** **6 Claims**




1. A tear-off closure for a container comprising,
a cap body having a top and an integral, skirted cap wall depending from the periphery of the cap top for attachment to the container,
said cap wall terminating in a peripherally extending bead, a deformable bridge portion connects a minor portion of said bead with said cap,
a sever line extending generally around said cap wall from one side of said bridge portion to the opposite side of said bridge portion to enable severing of a major portion of said bead from said cap to form a pull-ring for pulling said cap from said container.

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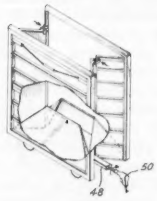
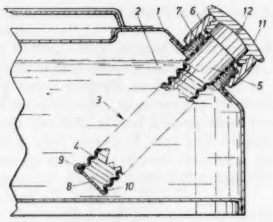
**3,865,269**
**COLLAPSIBLE MATERIAL HANDLING AND STORAGE CONTAINER**
**Kenneth L. Coleman, 1825 N. Lincoln Plaza, Apt. 105, Chicago, Ill. 60614**
**Filed Dec. 3, 1973, Ser. No. 421,238**
**Int. Cl. B65d** *7/24*
**U.S. Cl. 220—6** **14 Claims**




1. A collapsible container comprising, in combination,
two opposing, parallel, non-folding sidewalls,
two opposing, folding end-walls, each comprising a pair of adjacent panels joined by a vertically extending inwardly pivotable, central boundary,
hinge means for joining the outer vertical edges of each of said folding end-walls to the vertical edge of said non-folding sidewalls,
a floor structure adapted to be folded upwardly between said sidewalls when said container is collapsed, and
a two-way drive mechanism for urging the central boundaries of said opposing end-walls toward one another to collapse said container, and for applying a reverse force urging said central boundaries away from one another to erect said container.

**3,865,270**
**DEVICE FOR COMPENSATING EXCESS PRESSURES IN CLOSED CONTAINERS**
**Bengt Olov Petersson, Korkarlens Gata 18, Hisings Backa, Sweden**
**Filed Mar. 8, 1973, Ser. No. 339,377**
**Int. Cl. B65d** *25/00*
**U.S. Cl. 220—85 B** **2 Claims**




1. In an improved device for compensating for pressures inside a closed container designed to hold volatile fluids, said device comprising an elongate hollow body adapted to project from the outside of said container into the container interior, means defining an opening communicating the interior of said hollow body with the atmosphere surrounding said container, said hollow body being flexible and so constructed, under the influence of an excess gas pressure generated inside said container, to be compressed so as to allow air present in said body to be evacuated through said opening, the inherent resiliency of said body being such as to allow said body to resume its original shape upon cessation of said excess gas pressure, the improvement comprising:
said hollow body being disposed in the filling and drainage aperture of said container and having the shape of a tube with a pleated or undulating wall; and
closure means being provided at the end of said hollow body which projects into the interior of the container to close said interior end.

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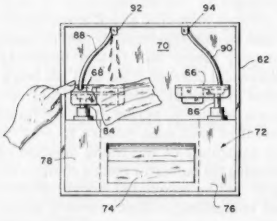
**3,865,271**
**DISPENSER AND LIQUID APPLICATOR FOR TOILET PAPER, PAPER TOWELS, AND THE LIKE**
**Max Gold, 3000 Bronx Park East, Bronx, N.Y. 10467**
**Continuation-in-part of Ser. No. 253,737, May 16, 1972, abandoned. This application July 26, 1973, Ser. No. 382,678**
**Int. Cl. A47k** *10/44*
**U.S. Cl. 221—96** **5 Claims**




1. A self-contained paper dispenser and flowable substance discharge device for selective application to said paper comprising: a cabinet provided with an interior access means, an expendable combination paper and flowable substance supply package, a valve and connected discharge conduit located inside of said cabinet, said valve being selectively attached to and removable from said flowable substance supply, a depressible manual operator in said cabinet, said conduit being

positioned in said cabinet above and having a discharge end spaced from said manual operator whereby the user's hand grasping the paper may be inserted in said space between the discharge conduit end and said manual operator in order to depress said manual operator for opening the valve and permitting the flow of the flowable substance through said discharge conduit to said paper.

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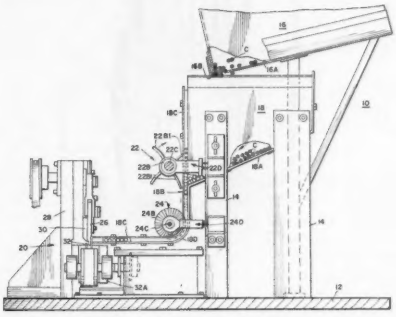
**3,865,272**

## APPARATUS FOR TRANSFERRING CYLINDRICAL ARTICLES AND THE LIKE FROM A SUPPLY STATION TO A WORK STATION

**Harvey A. Spies, Baltimore, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.**

**Filed Nov. 16, 1971, Ser. No. 199,270**
**Int. Cl. B65h** *5/00*
**U.S. Cl. 221—236** **4 Claims**



**1.** An apparatus for transferring elongated articles from a supply station to work station comprising:

a. guide means having an outlet end adjacent said work station and holding a plurality of said objects in tandem with the long dimension of the latter disposed transversely of the said guide means;

b. a reciprocating gate means mounted across said outlet end of said guide rails, adjacent said work station, for passing said articles to said work station in a first open position and for blocking the passage thereto in a second closed position;

c. flexible rotary brush means continuously energized and engaging one or more of said elongated articles in said guide means for continuously impelling said articles in side-by-side contiguous relationship toward said gate means with a substantially constant biasing force; and

d. means for selectively varying the rate of reciprocation of said gate means between said first and second positions to selectively control the number of said articles passed through said gate means from said guide means while said gate means is in said first position in each reciprocation of said gate means.

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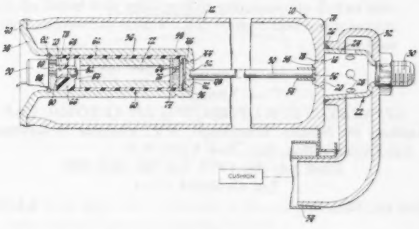
**3,865,273**

## INFLATOR

**Philip B. Zeigler, Port Clinton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 25, 1973, Ser. No. 373,282**
**Int. Cl. F17c** *7/00*
**U.S. Cl. 222—5** **1 Claim**

**1.** The combination comprising, an inflator having a pressure fluid chamber and an annular combustion chamber opening at the outer end thereof to atmosphere, means sealing the inner end of the combustion chamber to the pressure fluid chamber, a cartridge assembly including an annular housing having inner and outer ends and containing a gas generating charge of propellant for inflating an occupant restraint cushion, igniter means mounted on the outer end of the cartridge assembly for initiating the charge of propellant, the housing, propellant charge and igniter means being inserted within the combustion chamber or withdrawn therefrom through the open outer end of the combustion chamber, the combustion chamber including a groove opening inwardly thereof adjacent the open outer end thereof, an annular split ring within the groove, and wedge means engaged between the split ring



and the outer end of the cartridge assembly, and means coacting between the inner ends of the cartridge assembly and of the combustion chamber to bias the cartridge assembly outwardly of the combustion chamber and engage the wedge means with the split ring, the wedge means applying a wedging force on the split ring to wedge the split ring in the groove under the reaction forces of the cartridge assembly generated by initiation of the charge of propellant.

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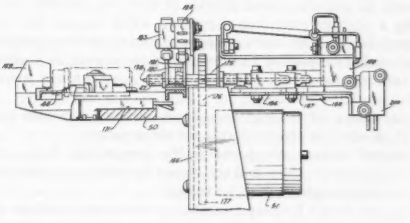
**3,865,274**

## LIQUID DISPENSING APPARATUS

**Joseph N. Genese, Paterson; Edward J. Rapoza; Charles F. Galanaugh, both of Butler; Harry M. Kennard, Chester; Roger A. Chevalaz, Rockaway, and John A. Smith, East Orange, all of N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.**

**Division of Ser. No. 160,868, July 8, 1971, Pat. No. 3,785,533. This application Feb. 27, 1973, Ser. No. 336,280**
**Int. Cl. G01f** *11/06*
**U.S. Cl. 222—37** **2 Claims**



**1.** A liquid dispensing apparatus comprising:

a cartridge adapted to retain a quantity of liquid, said cartridge comprising a tubular barrel closed at one end by a nozzle and at the opposite end by a cylindrical piston, said cylindrical piston being positioned within the bore of said tubular barrel and having an external diameteradapted to sealingly engage the interior cylindrical surface of said bore,

a holding frame for mounting said cartridge with said nozzle directed downwardly, same frame further mounting an axially movable plunger having a forward end adapted to engage the outer wall of said cylindrical piston,

and means for axially advancing said plunger a predetermined distance whereby said piston is axially advanced into the bore of said tubular barrel and a predetermined quantity of said liquid is ejected through said nozzle,

means for initially advancing said plunger into engagement with the outer wall of said cylinder plug,

said initial advance means comprising a control rod disposed coaxially within said plunger,

said control rod being axially movable within said plunger and being normally disposed to extend a short distance beyond said forward end of said plunger,

switch means at the rear end of said plunger operatively connected to said control rod to detect rearward movement of said control rod in relation to said plunger, and said switch means acting to terminate said initial advance means when said control rod contacts the outside wall of said piston.

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**3,865,275**

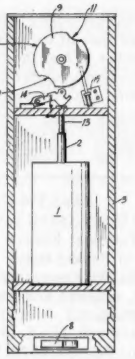
**APPARATUS FOR OPERATING AN AEROSOL CAN**

**Anthony De Nunzio, Brentwood, N.Y., assignor to Raymond Lee Organization, Inc., New York, N.Y.**

**Filed July 30, 1973, Ser. No. 383,970**

**Int. Cl. B65d *83/14***

**U.S. Cl. 222—70** **1 Claim**



1. Apparatus for operating an aerosol can to spray its contents for predetermined periods of time, the aerosol can having a plunger extending therefrom which causes the can to spray its contents when depressed, said apparatus comprising a housing supporting an aerosol can in an upright position;

an electric motor mounted in the heousing and having a shaft;

a source of electric power electrically connected to the motor for energizing the motor to rotate;

switch means interposed in the connection between the source of power and the motor for selectively controlling the energization of the motor;

a disc in the housing mounted on the motor shaft for rotation therewith and having more than one identation formed in the circumference thereof, the indentations being equiangularly spaced from each other, each indentation having the configuration of part of a circle;

a mechanical coupling movably mounted in the housing between the circumference of the disc and the plunger of the can, the mechanical coupling comprising a pin movably mounted in the housing for movement in axial directions in proximity with the plunger of the can and a spring-biased arm pivotally mounted in the housing between the circumference of the disc and the pin in a manner whereby when the indentation of the disc is adjacent the arm said arm moves into said indentation out of contact with the pin and when the remaining circumference of the disc is adjacent the arm it abuts said arm and moves said arm into contact with the pin and forces said pin against the plunger to depress said plunger to spray the contents of the can.

**3,865,276**

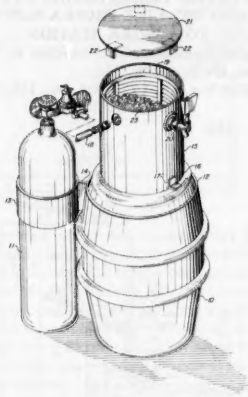
**PORTABLE KEG TAPPER**

**Hank A. Thompson, 3811 N. 21st Pl., Phoenix, Ariz. 85016**

**Filed Nov. 26, 1973, Ser. No. 418,952**

**Int. Cl. B67d *5/62***

**U.S. Cl. 222—146 C** **1 Claim**



1. Portable apparatus for tapping a beer keg, said key including

a generally cylindrical side wall closed by a top and a bottom and having a recess formed in the upper end thereof, and

means defining a normally sealed tapping aperture in the top of the keg which is automatically opened when a tapping assembly is slidably sealingly inserted therethrough,

said tapping assembly including

an elongate rigid pipe dimensioned to extend from substantially the bottom of said keg upwardly through said tapping aperture and terminating at its upper end in means for releasably attaching a beer-delivery conduit thereto, and

a gas-delivery pipe formed around the upper portion of said tapping pipe to extend coaxially into the upper portion of said keg, the inside diameter of said gas-delivery pipe being larger than the outside diameter of said tapping pipe, the annular space between said pipes communicating with means for releasably connecting said gas-delivery pipe to a source of gas under pressure, said apparatus comprising:

a. a portable ice-containing cooling chamber having the lower end thereof sized and shaped to be received within the recess in the upper end of said keg and having an aperture in the bottom thereof communicating with the tapping aperture in the top of said keg;

b. a beer-dispensing faucet carried by said cooling chamber; and

c. beer-delivery conduit means forming a cooling coil inside said ice-containing chamber, the inlet of said conduit means terminating in means for releasably coupling said coil to the upper end of said tapping pipe and the outlet thereof communicating with the inlet of said dispensing faucet.

3,865,277

## BEVERAGE-DISPENSING MACHINE

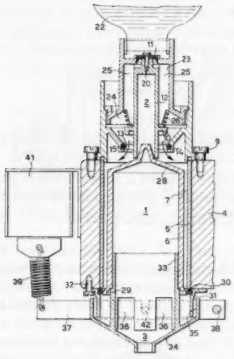
Tito Rimini, Milan, Italy, assignor to Bras S.p.A., Rozzano (Milano), Italy

Filed Dec. 3, 1973, Ser. No. 420,855

Claims priority, application Italy, Dec. 5, 1972, 32516/72; Sept. 27, 1973, 29484/73

Int. Cl. B67d *5/62*

U.S. Cl. 222—146 HE 11 Claims



1. A hot beverage dispensing machine for delivering individual preselected dosage units of the beverage, characterized by comprising a reservoir in communication through a first port with a metering chamber which, in turn, communicates through a second port with a heating chamber equipped with a third dispensing port, a first, a second and a third valve means controlling said first, second and third port and being mechanically linked to be axially translated between a first and a second end position in which the first and the third ports are open while the second port is closed, respectively, and vice versa.

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3,865,278

## LABORATORY FEEDING DEVICE FOR PARTICULATE MATERIAL

Fritz Gallati, Zurich, Switzerland, assignor to Mettler Instrumente AG, Greifensee-Zurich, Switzerland

Filed Aug. 15, 1973, Ser. No. 388,376

Claims priority, application Switzerland, Aug. 24, 1972, 12528/72

Int. Cl. B65g *65/70*

U.S. Cl. 222—161 9 Claims

1. A feeding device comprising:

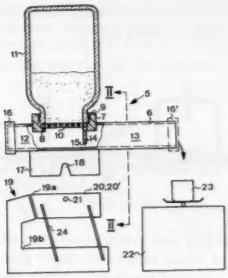
a. a tube having a first axis and formed with an axially open terminal opening and a radial opening axially remote from said terminal opening;

b. first coupling means for coupling a container to said tube in sealing engagement in a position in which said container communicates with the interior of said tube through said radial opening,

1. said first coupling means including an annular adapter having a second axis transverse to said first axis and formed with internal threads about said second axis,

2. said adapter being sealingly secured to said tube, and said second axis passing through said radial opening;

c. second coupling means for coupling said tube to a vibrator and for thereby vibrating said tube in the direction of



said first axis, and a vibrator releasably attached to the tube by said second coupling means.

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3,865,279

## COVER FOR AEROSOL INHALATING DEVICE

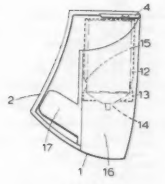
Michael James, Welwyn Garden City, England, assignor to Allen & Hanburys Limited, London, England

Filed June 20, 1973, Ser. No. 371,941

Claims priority, application Great Britain, June 27, 1972, 29956/72

Int. Cl. A61m *11/04*

U.S. Cl. 222—182 3 Claims



1. An aerosol medicament applicator comprising a hollow body open at the upper end thereof said hollow body having a chamber, said chamber having means to removably receive and retain an aerosol container, an applicator outlet spout leading out of a side of the body adjacent the lower end thereof and a cover member hingedly connected to the body at the upper end thereof, said cover having a first portion which, when the cover is closed, closes the open upper end of said hollow body and an integral second portion which encloses the outlet spout.

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3,865,280

## FILLING SPOUT ASSEMBLY FOR SOLID MATERIALS

Ely Knox Thomson, Houston, Tex., assignor to Continental Carbon Company, Houston, Tex.

Filed Apr. 10, 1974, Ser. No. 459,771

Int. Cl. B67d *5/54*

U.S. Cl. 222—193 6 Claims

1. A filling spout assembly comprising

a hopper leading to an opening for particulate solids;

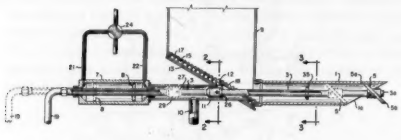
the bottom of said hopper being equipped with a perforated solids support with an air space between said bottom and said support;

a conduit for supplying low-pressure air to said air space through an air passageway;

an open-ended tubular filling spout in communication with said opening;

an air evacuation tube concentrically and slideably mounted within said spout and passing through said opening;

a valve mounted on said evacuation tube, the outer circular diameter of said valve slideably conforming to the inside diameter of said filling spout;



means for sliding said evacuation tube and valve from a first position in which said valve closes the end of said filling spout to a second position in which said valve opens the end of said spout and for sliding said tube and valve from said second position back to said first position.

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**3,865,281**

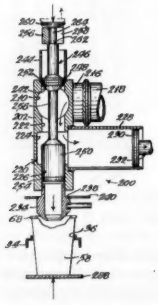
**APPARATUS FOR FILLING CONTAINERS**

**Carl Byrd, Chicago, and Martin Mueller, Glenview, both of Ill., assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 38,245, May 18, 1970, Pat. No. 3,659,744. This application Mar. 16, 1972, Ser. No. 235,438**

**Int. Cl. G01f** *13/00*

**U.S. Cl. 222—252** **16 Claims**



1. A container filling apparatus for transferring product from a product source to a container comprising: a valve body having a product inlet communicating with said product source; a valve chamber within said body; means establishing communication between said product inlet and said valve chamber; means defining a cylinder extending outwardly from said valve body in communication with said chamber; a piston reciprocally mounted in said cylinder; drive means for moving said piston within said cylinder; a product discharge nozzle positioned in an outlet end of said chamber; a control valve spool mounted for movement within said chamber between a first position and a second position, said spool including a plunger portion for forcing product from said inlet to said cylinder when said valve spool moves from said first to said second position, and said spool including a control portion movable from a position preventing product from flowing from said inlet to said cylinder in the first position of said valve spool while allowing product to flow from said cylinder outwardly of said chamber through said nozzle, said control portion being movable to a position allowing product to flow from said inlet into said cylinder in the second position of said valve spool while preventing product from flowing from said cylinder; and means for shifting said spool in timed relationship to the drive to said piston so that said piston moves away from said chamber in a product intake stroke when said valve spool is in said first position and said piston moves toward said chamber in a product discharge stroke when said valve spool is in said second position.

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**3,865,282**

**DEVICE FOR METERING MOLTEN METAL TO CONSUMER STATIONS**

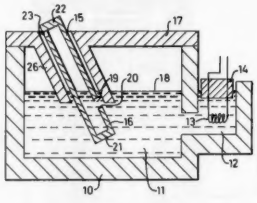
**Sven Ivan Sieurin, Upplands Vasby, Sweden, assignor to Granges Essen Aktiebolag, Vasteras, Sweden**

**Filed May 31, 1973, Ser. No. 365,745**

**Claims priority, application Sweden, June 5, 1972, 7372/72**

**Int. Cl. B22d** *37/00*

**U.S. Cl. 222—356** **3 Claims**



1. A device for metering molten metal to casting machines comprising, in combination, a storage container with melt therein, a ladling device capable of being dipped into the melt in said storage container and movable between a ladle filling position in the melt and a ladle emptying position at a casting machine, said ladling device extending in an initial position with a close fit through an opening in a portion of the walls of said storage container, and at least one shield member extending into the melt for restricting the communication between said opening in the walls of said storage container and the surface level of the melt.

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**3,865,283**

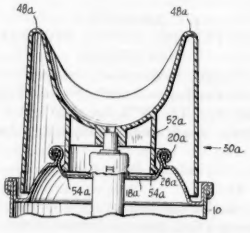
**CONFINING HAND-HELD DISPENSER CAP**

**Thomas H. Hayes, Westport, Conn., assignor to VCA Corporation, Greenwich, Conn.**

**Continuation-in-part of Ser. No. 284,429, Aug. 28, 1972, Pat. No. 3,770,170. This application Nov. 1, 1973, Ser. No. 412,050**

**Int. Cl. B65d** *41/18*

**U.S. Cl. 222—402.11** **5 Claims**



1. A hand-held dispenser for a pressurized product, comprising in combination:

a. a container having a circular top rim,

b. a closure cup secured to the top rim of the container,

c. said cup having an upright wall with an annular recess providing an undercut surface, said wall further having an out-turned crimping bead adapted to be crimped over the rim of the container,

d. a valving member carried by said cup and reciprocative between predetermined end limits,

e. an actuator cap having means engageable with said valving member to operate the latter, said cap having a depending skirt insertable and movable in the upright wall of the cup,
f. said skirt having shoulder means adapted to be received in the annular recess of the cup wall, for enabling limited axial movement of said cap between advanced and retracted positions with respect to said cup,
g. said shoulder means normally retaining the cap against removal from the cup,
h. said container having a top wall provided with an annular groove at the outer edge,
i. an additional depending skirt disposed outside and concentric with the first-mentioned skirt,
j. said additional skirt constituting the outer wall of the cap,
k. said additional skirt being receivable in said annular groove of the container top wall when the actuator cap is moved to its retracted position.

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**3,865,284**

## DRESS FORM OF CELLULAR DOUBLE LAYER OF THERMOPLASTIC MATERIALS

**Ken Kazama, Kyoto; Kunio Ohno; Mamoru Umegae, both of Kawasaki, and Mineko Yonei, Takatsuki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed June 30, 1972, Ser. No. 267,932**
**Claims priority, application Japan, July 26, 1971, 46-55215**
**Int. Cl. A41h** *5/00*
**U.S. Cl. 223—68** **3 Claims**

1. A dress form comprising a layered wall having the external form of a human torso and having an outer cellular layer and integral thereto an inner cellular layer;
a. said outer cellular layer having an expansion ratio of from 2 to 20 and comprising a thermoplastic polymeric material having an elastic modulus of 500 to 10 kg/cm² and selected from the group consisting of ethylene-vinyl acetate copolymers, ethylene-acrylate copolymers, and ethylene-methacrylate copolymers; and
b. said inner layer comprising a thermoplastic polymeric material having a Young's modulus of 2,000 to 50,000 kg/cm².

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**3,865,285**

## SEAMBUSTER

**Leonard J. McCormack, Clearbrook, Va., and Wallace L. DeGrange, Jr., Martinburg, W. Va., assignors to Reimers Electric Steam, Inc., Clearbrook, Va.**

**Filed July 8, 1974, Ser. No. 486,439**
**Int. Cl. D06c** *15/00*
**U.S. Cl. 223—73** **4 Claims**

1. A seambuster apparatus for pressing fabric materials, comprising: a hollow pedestal; a rotatable shaft mounted in said pedestal; means for rotating said shaft through an angle of 180°; a buck plate mounted for rotation on one end of said shaft exteriorly of said pedestal; a pair of elongated pressing bucks, one end of each buck being attached to said buck plate, each pressing buck being of generally rectangular cross-section with the top and bottom surface thereof being perforated, and being divided by a partition into an upper and lower compartment extending the length of said buck; four holes extending through the central portion of said buck plate, said holes being aligned with the ends of the four buck compartments; a pair of vacuum activator valves mounted in said pedestal, said valves being connected at their outlet ends to a common vacuum source and each valve being connected at its inlet end to a conduit which extends to a hole in a bearing plate mounted on the exterior of the pedestal, said bearing

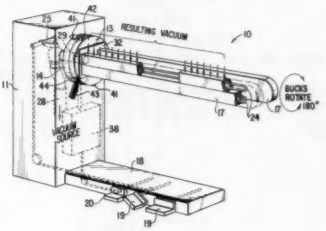


plate being aligned with the buck plate so that each of the two holes in the bearing plate is in alignment with a respective upper hole in the buck plate, with the result that fluid communication is provided between each upper buck compartment and a respective vacuum activator valve; means for operating each vacuum activator valve to draw a vacuum on the corresponding upper buck compartment; a heating element located in each of the four compartments and extending the length thereof; and means for operating each heating element.

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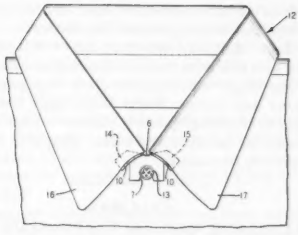
**3,865,286**

## COLLAR STAY

**Irving D. Tiss, 2 Archbridge Ln., Springfield, N.J. 07081**

**Filed Feb. 21, 1974, Ser. No. 444,379**
**Int. Cl. D06c** *15/00*
**U.S. Cl. 223—83** **2 Claims**

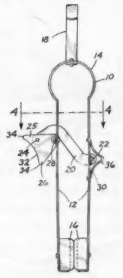


1. A collar stay in the form of a stiff yieldably flexible flat substantially H-shaped material having vertically oriented opposite side edges and horizontally oriented upper and lower edges, the upper and lower edges each having a V-shaped notch therein centrally between the opposite side edges of the material and located in a common theoretical vertical plane, the notch in the horizontally oriented upper edge having a depth substantially greater than the notch in the horizontally oriented lower edge, one flat surface of the material being coated with a pressure sensitive adhesive material, and a removable backing material covering the pressure sensitive adhesive material.

## 3,865,287
## GARMENT HANGER

Eldon L. Peterson, 4631 E. B St., Tacoma, Wash. 98404

Filed Nov. 28, 1973, Ser. No. 419,639
Int. Cl. A47j *51/14*
U.S. Cl. 223—96 2 Claims



1. A garment hanger comprising:

a. a U-shaped body member having a pair of arms and a springy connecting portion therefor normally urging the arms apart,

b. jaw means on said arms arranged to receive a garment portion therebetween for clamping and holding the garment,

c. a laterally extending link pivotally connected at one of its ends to one of said arms,

d. an over-center latch member pivotally connected to the other of said arms and having a finger-engaging portion projecting laterally outward from said arm for finger engagement by an operator,

e. means pivotally connecting the other end of said link to said latch member,

f. said latch member being rotatable between a released position and an over-center locked position, the movement of said latch member to its released position driving said link and said one arm outwardly from the arm on which the latch member is supported to spread the arms apart to receive a garment between the jaws and the movement of said latch member to its over-center locked position pulling the link and said one arm toward the arm on which the latch member is supported to clamp the jaws together and hold a garment therebetween,

g. and finger abutment means on the outside of the arm to which said link is pivotally connected facilitating anchoring one finger thereagainst upon engaging said latch member with another finger of the same hand, thus providing a clamping garment hanger which is operable between the released and locked positions of said latch member by one hand.

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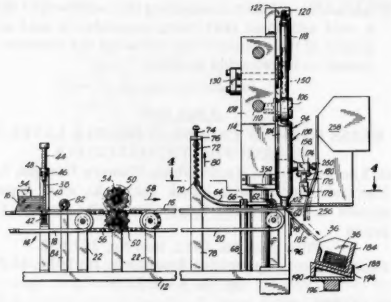
## 3,865,288
## APPARATUS FOR MANUFACTURING SLIDE COVERS

Peter Hunsinger, Brooklyn, N.Y., and James C. White, Rutherford, N.J., assignors to Propper Manufacturing Company, Inc., Long Island, N.Y.

Division of Ser. No. 115,211, Feb. 16, 1971,. This application Oct. 27, 1972, Ser. No. 301,683
Int. Cl. B26f *3/00*
U.S. Cl. 225—96.5 7 Claims

1. In an apparatus for manufacturing slide covers, feeding means for successively feeding elongated blanks longitudinally through and beyond a predetermined cutting location cutting means located at said cutting location for cutting a slide cover from a blank which extends through and beyond said cutting location, and control means for responding automatically to movement of each blank through and beyond said cutting location and operatively connected to said feeding means and cutting means for automatically terminating the operation of said feeding means when a predetermined length of each blank extends beyond the cutting location and for then operating the cutting means to cut a slide cover of said predetermined length from each blank, and said control means then again starting the operation of said feeding means at the end of the operation of said cutting means so that said control means automatically carries out successive cylces during which each blank is first fed and then cut for automatically deriving slide covers of predetermined length from blanks successively fed by said feeding means, said cutting means including a scoring means for scoring a cutting line across a



blank at said cutting location and a hammer means for tapping the blank beyond the cutting line scored therein by said scoring means to break a slide cover from the blank along said cutting line, said scoring means and hammer means both being situated over a blank with said cutting means further including an anvil edge extending along said cutting line beneath a blank with the latter extending beyond said anvil edge to be engaged by said hammer means, and a stationary inclined receiving surface extending downwardly from said anvil edge and spaced beneath the blank at the side thereof opposite from said hammer means so that when the latter breaks a slide cover from the blank, the slide cover will be received by said stationary receiving surface to slide down the latter.

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## 3,865,289
## FORWARD DRAW REVOLVER HOLSTER

Paul D. Boren, 9426 Portada Dr., Whittier, Calif. 90603

Filed Dec. 14, 1973, Ser. No. 425,175
Int. Cl. F41c *33/02*
U.S. Cl. 224—2 B 3 Claims

1. A forward draw holster comprising:

a two-ply body having a rear portion bent to curved form, the same being provided with an elongated opening closed on all sides to allow the trigger and trigger guard of a revolver disposed in the holster to extend rearwardly therethrough,

opposite wing-shaped portions of generally rectangular shape extending from the opposite sides of said rear portion and folded forwardly to form the opposite sides of the holster,

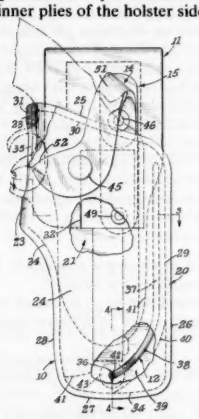
said wing-shaped portions extending downwardly from said rear portion to a length to accommodate the barrel and adjacent portions, and the muzzle, of a revolver disposed in the holster,

the upper edge of each of said holster sides sloping downwardly from the upper edge of the rear portion toward the respective forward edges of said sides,

the holster sides, adjacent to their front edges, being provided with pockets between the two plies of the body, said pockets being generally parallel to said front edges of the holster sides, for the upper parts of the height of said sides, and rearwardly curved, for the lower parts thereof,

toward the rear edges of the holster sides and away from the forward edges of the holster sides, and

a spring for biasing said forward edges toward each other comprising two slightly converging arms residing in the parallel upper parts of the pockets, the lower ends of said spring arms being rearwardly curved and residing in the rearwardly curved portions of the mentioned pocket, and the lower portions of the rearwardly curved spring arm portion being connected by a rounded bight that extends through the inner plies of the holster sides and across the



space, between said sides, that is below the end if the muzzle of a revolver disposed in the holster, the portion of the mentioned spring bight that extends across the space between the holster sides is provided with a non-metallic member that is interposed between the end of the revolver muzzle in said holster and adjacent portions of the spring bight to prevent abrasion-causing contact between the spring bight and the muzzle during movement of the revolver to a generally horizontal position with said muzzle protruding between the forward edges of the holster sides.

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**3,865,290**

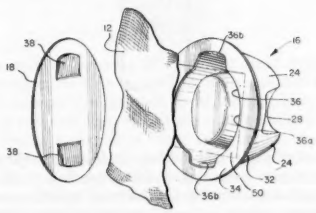
**TENNIS BALL HOLDER**

**Charles A. Sperling, Wayland, Mass., assignor to Cross Newform Plastics Co., Inc., Worcester, Mass.**

**Filed Oct. 5, 1973, Ser. No. 404,030**

**Int. Cl. A45f** *5/00*

**U.S. Cl. 224—5 D** **5 Claims**



**1.** A ball holder comprising

A. a hollow shell

1. having a concave face arranged to resiliently receive and engage a ball,

2. being formed with a plurality of hollow, resilient fingers distributed about and projecting out from the concave face of the shell, and

3. being formed with at least two thin-walled webs stretching between at least three adjacent shell fingers, and having a generally flat rear wall,

B. means defining a keyhole in the rear wall, and

C. a flat plate arranged to be positioned flush against the rear wall, said plate constituting a key arranged to engage in the keyhole when the plate is placed flush against the rear wall so that the shell and plate can be locked together on opposite sides of a player's clothing to anchor the holder to the clothing.

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**3,865,291**

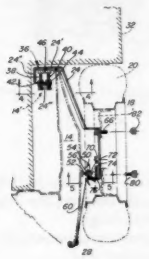
**SPARE TIRE HOLDER**

**Richard Wm. Tidwell, 4308 Mackey Ave., St. Louis Park, Minn. 55424**

**Filed Mar. 20, 1973, Ser. No. 343,168**

**Int. Cl. B62d** *43/02*

**U.S. Cl. 224—42.24** **4 Claims**



**1.** A spare tire holder for a pickup truck having a box portion including upstanding side walls which have an integral top wall, comprising

an elongated spine capable of bearing the weight of a truck wheel and tire, the maximum horizontal and vertical dimensions of said spine lying parallel to said side walls when said spine is mounted on said truck being less than the outside diameter of said truck wheel and tire;

adjustable wheel securing means for securing truck wheels of various dimensions to said spine;

clamping means positioned beneath the top wall for clamping the upper portion of said spine to the top wall of one of said side walls without altering said one of said side walls, the maximum horizontal dimension of said clamping means lying parallel to said side walls when said spine is mounted on said truck being less than the outside diameter of said truck wheel;

adjustable pad means for preventing the chafing of said one of said side walls by said spine and permitting selective orientation of said spine;

hook means for engaging the bottom of one of said side walls; and

tension means extending between said hook means and the lower portion of said spine for maintaining said pad means in contact with said one of said side walls.

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**3,865,292**

**BOOK STRAP**

**Gerard X. Foley, 44 Franklin Ave., New Rochelle, N.Y. 10805**

**Filed Feb. 4, 1974, Ser. No. 439,240**

**Int. Cl. B65d** *63/16*

**U.S. Cl. 224—55** **5 Claims**

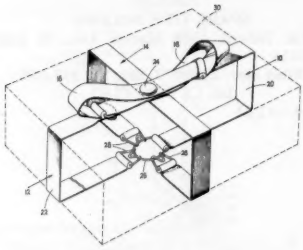
**1.** A device for carrying a package comprising:

a first strap, a second strap and a third strap, each of said straps being formed from an elastic material;

means securing said first, second and third straps to each other at a common location between the ends of each of said straps;

said first and second straps extending along substantially the same direction, said first strap having an end which extends outwardly from said common location beyond the adjacent end of said second strap, the opposite end of said second strap extending beyond the corresponding opposite end of said first strap;

a looped member secured to the shorter segment of said second strap and receiving the longer segment of said first strap therethrough;



the shorter end of said first strap having a looped member secured thereto and receiving the longer segment of said second strap therethrough;

said third strap extending substantially transverse to said first and second straps; and

fastener means secured to the outermost end of each of said first and second straps and to each of the ends of the third strap to enable said straps to be wrapped about said package and to enable said fasteners to be secured together on the opposite side of said package.

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**3,865,293**

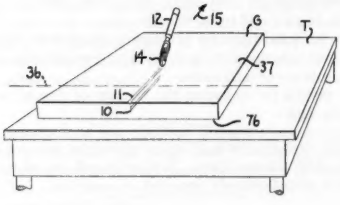
**SUBSURFACE CRACKS**

**Fred M. Ernsberger, Pittsburgh, and Charles M. Hollabaugh, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 10, 1972, Ser. No. 242,511**

**Int. Cl. B26f** *3/00*

**U.S. Cl. 225—2** **21 Claims**




1. A method of producing a cut edge on a piece of glass comprising the steps of:

applying a force to produce an indentation in a major surface of the glass and, concurrently, a subsurface discontinuity therebelow along an intended path of cut, at least a substantial portion of said discontinuity, along its length, being spaced from said major surface by a zone of glass, and

projecting said discontinuity deeper into the thickness of said glass after said discontinuity is produced.

**3,865,294**

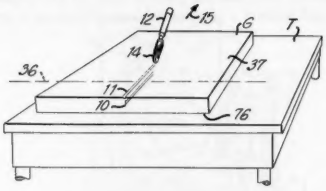
**SUBSURFACE CRACKS**

**Fred M. Ernsberger, Pittsburgh, and Charles M. Hollabaugh, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 242,511, April 10, 1972,. This application Dec. 6, 1973, Ser. No. 422,393**

**Int. Cl. B26f** *3/00*

**U.S. Cl. 225—2** **4 Claims**




1. A method of producing a subsurface discontinuity in a piece of glass comprising the steps of:

positioning a wheel that has a diameter of at least approximately 12 millimeters on a major surface of a piece of glass,

applying a force of at least approximately 80 kilograms to said wheel in a direction substantially perpendicular to said major surface, and

advancing said wheel along the intended path to create an indentation in said surface and, concurrently, a subsurface discontinuity therebelow in the glass.

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**3,865,295**

**TOILET PAPER ROLL HOLDING DEVICE**

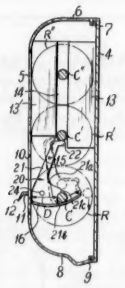
**Tadasu Okamura, 261 Narashino-machi, 4 chome, Funabashi City, Japan**

**Filed Sept. 13, 1973, Ser. No. 396,749**

**Claims priority, application Japan, Dec. 29, 1972, 47-3587**

**Int. Cl. B65h** *19/00*

**U.S. Cl. 225—47** **4 Claims**




1. A toilet paper roll holding device comprising an elongated vertically extending housing opening at the top and bottom ends for receiving a plurality of toilet paper rolls one upon another and including a front wall provided with a paper dispensing window, a rear wall spaced from and parallel to said front wall and a pair of spaced and parallel side walls; a top cover pivoted to said open top end of the housing; a bottom cover pivoted to said open bottom end of the housing; and a paper shearing blade provided on said front wall adjacent to said dispensing window, a rockable paper roll receiving and core discharge member pivoted adjacent to the top end to said side walls and including a pair of opposite and spaced parallel upright arms integrally connected at their front edges by a

transverse connection part, each of said upright arms bulging rearwardly and downwardly to position the center of gravity thereof at a point below the mid-point of the height to be urged forwardly by the weight of a paper roll in the dispensing position adjacent to said window and pivots backwardly as the paper roll is consumed and having a core engaging bent upper end for moving to engage and disengage from the underside of the lowest one of said paper roll cores, the rear edge provided with an upper larger arcuate recess and a lower smaller arcuate recess separated from said upper recess by an intermediate projection and the upwardly arcuated lower edge; a pair of upwardly arcuated guide tracks formed with the inner surfaces of said side walls in a position to slidably engage said arcuated lower edges of the arms so as to hold said paper roll in the dispensing position in cooperation with said lower smaller recesses in the rear edges of the arms and to slidably guide said rockable member and the core of said paper roll in the dispensing position as the paper roll is consumed and the rockable member pivots rearwardly accordingly to move the empty core to the discharge position; and operation means for said rockable member to positively pivot the rockable member and slide the member on said tracks rearwardly.

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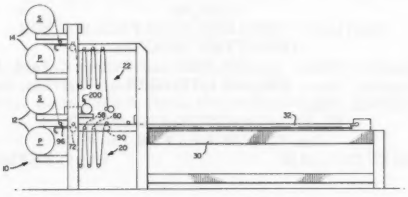
**3,865,296**

## APPARATUS FOR COVERING A GLASS SHEET WITH PAPER

**Robert F. Alverson, Kingsport, Tenn., assignor to ASG Industries, Inc., Kingsport, Tenn.**

**Filed Feb. 25, 1974, Ser. No. 445,072**
**Int. Cl. B65h** *17/42*
**U.S. Cl. 226—110** **9 Claims**



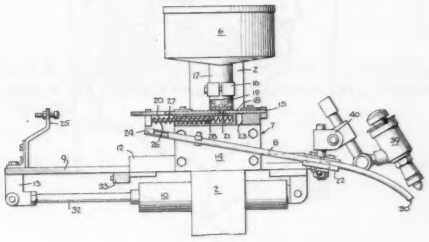
**1.** Apparatus for covering completely a sheet of plate glass which is adapted to be conveyed to and supported by a bed with sheet material comprising a frame, said frame supporting said bed at one end, feed means mounted by said frame at a position disposed therefrom, said feed means including a plurality of feed sections each having means adapted to support said sheet material in rolls of extended length, said feed section means being disposed across the width and at at least two elevations with respect to the plane of said bed, alternate feed section means being disposed at different elevations, carriage means mounted by said frame adjacent said bed, means on said carriage means for gripping a leading end of said sheet material, magazine means associated with each feed section for storing a continuous length of sheet material, means for indexing sheet material from selected rolls to said carriage means, and means for driving said carriage and selected lengths of sheet material across said bed as said selected magazine is resupplied with sheet material.

**3,865,297**

## AUTOMATIC CHARGE FEEDER

**Richard Stiefel, Weehawken, and Charles G. Krumm, Wyckoff, both of N.J., assignors to Kahle Engineering Co., Union City, N.J.**

**Filed Mar. 14, 1973, Ser. No. 341,316**
**Int. Cl. B23k** *1/00, 5/00*
**U.S. Cl. 228—11** **11 Claims**



**1.** An automatic charge feeder for feeding discrete charges onto an article in an article fastening system comprising the combination of:

a reservoir for the charges,

an elongated charge feed tube positioned below said reservoir having a charge receiving aperture at one end and a charge dispensing outlet at the other end,

a movable mounting for said tube,

drive means coupled to said mounting for moving said feed tube from a first position to a second extended feeding position with the charge receiving aperture at said reservoir and the dispensing aperture adjacent to an article and at a lower level than said charge receiving aperture, means for directing a charge from the reservoir into the receiving aperture of the feed tube while the tube is at the extended position,

control means for said drive means, and

said control means comprising a sensor for detecting the arrival of an article at the charge feeder.

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**3,865,298**

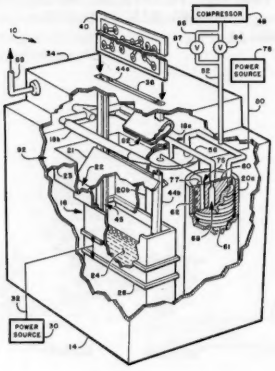
## SOLDER LEVELING

**Travis A. Allen, and Robert T. Sylvester, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Aug. 14, 1973, Ser. No. 388,305**
**Int. Cl. B23k** *1/08, 3/00*
**U.S. Cl. 228—20** **8 Claims**

**1.** Apparatus for removing excess solder from a printed circuit board containing conductive areas and plated through-holes and the like, comprising a container for retaining heated solder, generally vertically disposed guide means for guiding said printed circuit board into and out of said heated solder, jet means above said container for impinging from opposite directions compressed and heated gas onto opposite surfaces of a said printed circuit board, and a deflector disposed inter-

mediate said jet means and said container and inclined downwardly away from said guide means and overlying said container for deflecting said gas away from said container and the surface of said heated solder therein.

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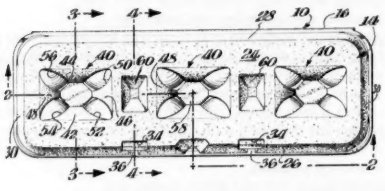
**3,865,299**

## EGG CARTON WITH FLEXIBLE WINDOW WELL

**Kenneth L. Crabtree, Fairfield, Maine, assignor to Keyes Fibre Company, Waterville, Maine**

**Filed Feb. 12, 1974, Ser. No. 441,906**
**Int. Cl. B65s** *1/00*
**U.S. Cl. 229—2.5** **10 Claims**



**1.** An egg carton molded from flexible material comprising a bottom having two generally parallel rows of downwardly dished egg pockets and upwardly tapering posts interspersed between the egg pockets, a cover having a generally flat top and downwardly and outwardly flaring side walls adapted to overlie the bottom in the closed carton condition, means for securing the bottom and cover together in the closed carton condition, the cover further including at least one window well downweardly recessed from the flat top including four downwardly and inwardly flaring separator segments, the segments being spaced from each other to define four open egg viewing windows in the window well, the segments being arranged so that they are located in the closed carton condition between two eggs packaged in one row of egg pockets and two eggs packaged in the other row of egg pockets and so that the four windows each provide a view of a portion of one of the four eggs, and a web connecting the lower portions of the segments together between the four eggs at a level in the closed carton condition which avoids contact with any portion of the carton bottom to permit flexure of the window well whereby the separator segments and web can adjust to accommodate variations in the spacings between the four eggs.

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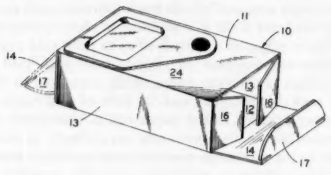
**3,865,300**

## CONTAINER

**Jack E. Caveney, Chicago, and Franklin L. Randolph, Clarendon Hills, both of Ill., assignors to Panduit Corp., Tinley Park, Ill.**

**Filed Sept. 7, 1972, Ser. No. 287,195**
**Int. Cl. B65d** *5/16, 43/18*
**U.S. Cl. 229—7 R** **4 Claims**



**1.** A container comprising: a front wall, a rear wall and side walls; said front wall having a pair of spaced openings, one of said openings comprising a circular anchoring opening and the other of said openings comprising a substantially rectilinear access opening; and a closure strip having a pair of spaced undercut complemental bosses respectively removably engaged in said spaced openings, said closure strip lying within the boundary of said front wall and being pivotable about said anchoring opening, said rectilinear access opening being substantially rectangular and the corners of said rectangular opening farthest removed from said circular anchoring opening being rounded, the degree of undercut of the access boss of said closure strip being nonuniform.

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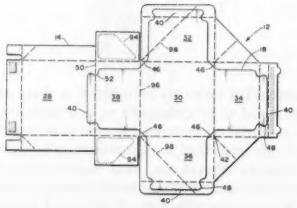
**3,865,301**

## PARTIALLY SHIELDED FOOD PACKAGE FOR DIELECTRIC HEATING

**Robert G. Pothier, Amherst, N.H., and Thomas E. Ford, Arlington, Mass., assignors to Trans World Services, Inc., Melrose, Mass.**

**Filed Nov. 15, 1973, Ser. No. 415,962**
**Int. Cl. B65d** *5/40, 5/56, 25/14*
**U.S. Cl. 229—14 H** **11 Claims**



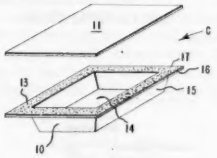
**1.** A food package comprising, in combination, a dielectric sheet and a conductive sheet thereon, said dielectric sheet having a plurality of panels and forming when set up a substantially closed container having a first wall and second and third walls contiguous with the first wall at fold lines intersecting at a corner point of the package, said conductive sheet having portions covering a region of each of said walls and having an edge substantially spaced from said corner point.

3,865,302

## CONTAINER FOR COOKING FOOD THEREIN

William P. Kane, Bon Air, Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 10, 1972, Ser. No. 305,250
Int. Cl. A47j 27/00; B65b 7/28; B65d 1/00, 5/64; B65b 29/08
U.S. Cl. 229—43 3 Claims




1. A container for cooking food including:

the combination of a dish-like tray of polyethylene terephthalate, the tray having a bottom part and a body part and an outwardly projecting peripheral flange having an upper surface on the upper extremity of the body part;

an adhesive of an ethylene copolymer and petroleum wax having a composition consisting essentially of (a) 30 percent to 40 percent by weight of petroleum wax and (b) 70 percent to 60 percent by weight of such ethylene copolymer, positioned only on the upper surface of the flange, the adhesive having a melt flow of less than 0.2 grams at 320°F. (160°C.) for 10 minutes and a surface free energy of less than 30 dynes; and

a substantially flat cover part of polyethylene terephthalate having lower surface parts adapted to be bonded to the flange by the adhesive, wherein said adhesive is free from flow at cooking temperatures up to about 400°F and said combination exhibits a bond strength greater than 100 grams/inch at 400°F and less than 500 grams/inch at room temperature when said cover part is bonded to said flange.

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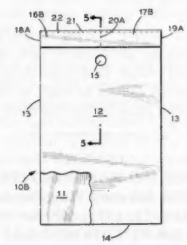
3,865,303

## BAG AND CLOSURE

Meyer Korn, 1980 S. Ocean Dr., Hallandale, Fla. 33009

Filed Nov. 13, 1972, Ser. No. 305,736
Int. Cl. B65d 33/16
U.S. Cl. 229—62 2 Claims




1. A bag comprising opposed plastic film panels, said panels being interconnected at their bottom and side edges, the unconnected top edges of said panels providing a mouth portion, each of said panels being formed with a single opening adjacent the mouth portion of said bag, said openings being in alignment with each other and being disposed intermediate the side edges of said panels, tieing means for the mouth portion of said bag, said tieing means comprising a strip, said strip comprising a pair of strip portions in end to end relation to each other, said strip being disposed adjacent one of said panels at the mouth portion of the bag, said strip being integral with said one panel, said strip overlying the outer surface of said one panel, a horizontal line of perforations defining the juncture of the top edge of said strip and said one panel, said strip being separable along a vertical line of perforations in said strip at a point intermediate the ends thereof to form said pair of strip portions, each having a free end, one free end of one strip portion being in opposed relation to one free end of the other strip portion, the said free ends of said strip portions being insertable through the aligned openings in said panels and drawn in a direction to constrict the mouth portion of the bag, the one free end of the one strip portion being tieable to the one free end of the other strip portion to provide a tied closure for the constricted mouth portion of the bag.

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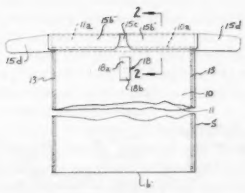
3,865,304

## BAG CONSTRUCTION

Albert B. Mojonnier, Chicago, and Paul W. Lenke, Skokie, both of Ill., assignors to Albert Majonnier, Inc., Franklin Park, Ill.

Filed July 26, 1972, Ser. No. 275,229
Int. Cl. B65d 33/30
U.S. Cl. 229—65 9 Claims




1. A reclosable bag construction comprising: front and rear walls of flexible sheet material connected at the side edges and at the bottom and open at the top, the rear wall being longer than the front wall to provide a top flap portion on said rear wall extending a selected height above the top edge of the front wall, and an elongated strap of ductile metal having a U-shaped cross section along at least a major portion of its length, said U-shaped strap having a front and rear flange portion respectively overlying the inner and outer faces of said top flap portion on the rear wall and clamping the top flap portion therebetween to attach the strap to the bag, said front flange portion extending downwardly from the upper edge of said top flap portion a distance slightly greater than said selected height of the top flap portion and overlying the outer face of said front wall along the upper edge thereof to releasably clamp said upper edge of the front wall to said rear wall and thereby releasably close the top of the bag whereby the front wall of the bag can be withdrawn from beneath the front flange portion of the strap to open the bag without releasing the front and rear flange portions of the strap from clamping engagement with the rear flap.

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3,865,305

## PROGRAMMABLE DISTANCE MEASURING INSTRUMENT

Harry R. Sampey, Vanderbilt, Pa., assignor to Pentron Industries, Inc., Cleveland, Ohio

Continuation of Ser. No. 194,401, Nov. 1, 1971, abandoned. This application Dec. 27, 1973, Ser. No. 428,700
Int. Cl. H03k 21/36
U.S. Cl. 235—92 DN 13 Claims

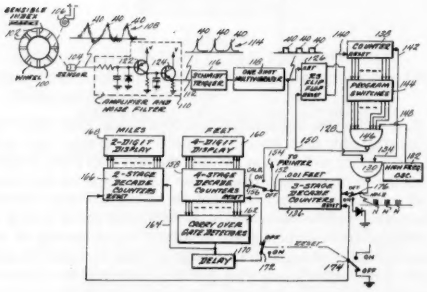
1. A variably programmable electronic distance measuring instrument for accumulating arbitrary distance increments in terms of any desired unit of distance measurement comprising:

a rotatable wheel having an unknown circumference dimension adapted for traversing distances,

input means adapted to cooperate with said rotatable wheel for repetitively producing electrical distance pulses, each of said distance pulses representing an arbitrary unknown but relatively fixed increment of distance or length traversed by said wheel under constant measurement conditions such as wheel speed,

variably adjustable programmable control means connected to said input means for producing a variable preselectable number of electrical clock pulses in response to each occurrence of one of said distance pulses, said preselectable number being variably selectable to represent the magnitude of said increment of arbitrary unknown distance or length in accordance with any desired arbitrary basic unit of distance measurement, and

accumulator and display means connected to receive and accumulate said clock pulses from said programmable control means whereby digital data is provided and visibly displayed which data represents a total measured distance or length traversed by said wheel comprising a plurality of said arbitrary unknown increments which is directly displayed in terms of said desired basic unit of distance measurement,




said variably adjustable programmable control means comprising:

clock means for producing clock pulses at a repetition rate that is high compared to the maximum expected repetition rate of said distance pulses,

digital counter means connected to count said clock pulses,

variably adjustable program means for presetting digital data therein representing said variably preselectable number,

start/stop control means connected for enabling said digital counter means in response to each received distance pulse and for resetting and disabling said digital counter means in response to detected coincidence between the preset data in said program means and the instantaneous contents of said digital counter means, and

clock means connected to said clock means and to said start/stop control means for passing clock pulses therethrough only while said digital counter means is enabled thereby passing said preselectable number of clock pulses.

**3,865,306**

## MEANS FOR CONTROLLING THE COURSE OF OPERATION OF AN AUXILIARY HEATING SYSTEM IN MOTOR VEHICLES OR SHIPS

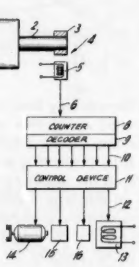
**Fritz Reuter, and Horst Jung, both of Esslinger (Neckar), Germany, assignors to J. Eberspacher, Esslingen, Neckar, Germany**

**Filed July 14, 1972, Ser. No. 271,710**

**Claims priority, application Germany, Aug. 13, 1971, 2140621**

**Int. Cl. G05d** *23/18*

**U.S. Cl. 237—2 A** **6 Claims**




**1.** In an auxiliary heating system, for supplementing or augmenting a main heating system, of a motor-driven vehicle, and including a main motor having a drive shaft, and of the type including, as components, a heat exchanger independent of the main system, a fuel pump, a heating air blower, an igniter for a fuel burner, and a safety switch, and further including a control device for its components: means for controlling the safety period, restarting delay, igniter operating time and safety switch of the auxiliary heating system, said means comprising, in combination, pulse generating means including a single pulse transmitter, constituted by a permanent magnet on said drive shaft and a stationary magnetic field responsive element operatively associated with said permanent magnet providing output pulses for controlling the operation of said auxiliary heating system; a pulse counter connected to said transmitter to receive and count such output pulses; a decoder connected to the output of said pulse counter to receive counted output pulses therefrom; and a pulse responsive control device, controlling the operation of said auxiliary heating system components, connected to said decoder to receive such output pulses therefrom; said pulse responsive control device having respective outputs connected to said heating air blower, said igniter, said safety switch and said fuel pump; said pulse-responsive control device providing control signals at each of its outputs only responsive to respective preselected numbers of counted pulses.

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**3,865,307**

## LOCKING RAILROAD SPIKE

**Luke J. Schiro, 3266 Ashwood Way, Soquel, Calif. 95073**

**Filed Oct. 12, 1973, Ser. No. 405,808**

**Int. Cl. E01b** *9/04, 9/12*

**U.S. Cl. 238—366** **2 Claims**

**1.** A railroad spike intended for securing a railroad rail to a railroad tie or supporting surface or the like, the railroad spike comprising, in combination:

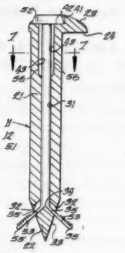
a spike comprising:

an elongated solid cylindrically shaped shank member having a top end, a bottom end, and cylindrical side walls;

a head member formed integrally with the top end of said shank member, said head member having an arcuately shaped top surface terminating at its perimeter in a flat horizontal bottom surface, said head member being

laterally offset relative to the longitudinal axis of the shank to define an annular shoulder portion completely about the top end of the shank with a portion of said head member projecting a greater distance laterally beyond one side wall of the shank than at the diametrically opposed end thereof, this distance of projection adapted to engage a foot portion of a railroad rail along a top surface thereof so said laterally projecting head member when the spike is used to secure a railroad rail to a railroad tie and the like;

an inverted conically shaped penetrating end formed integrally at the bottom end of said shank member and extending longitudinally downwardly therefrom and terminating in the penetrating pointed end disposed along the longitudinal axis of said shank member, the



base of said penetrating end formed integrally with the bottom end of said shank member;

a cylindrical bore extending longitudinally through said shank member concentric therewith extending from said head member to a point inwardly of said penetrating end and adjacent said base portion thereof;

a pair of diametrically opposed angular passageways each their innermost ends connected to the bottom end of the bore with their outermost ends projecting outwardly and downwardly from the bore and out of the conical side surfaces of the penetrating end in positions spaced intermediate the base and the point of the penetrating end, said passageways defining with said longitudinal axis of said shank member a plane bisecting said head member and lying parallel to the maximum projecting portion of said head member relative to said shank member, said passageways opening out of said conical side surfaces of said penetrating end at diametrically opposed points thereof;

a rectangularly elongated recess formed integrally in the top surface of said head member bisecting by said plane passing through said passageways, said recess lying parallel to said plane passing through said passageways and said bore, said recess extending diametrically along said head member parallel to the line of maximum projection of said head member from said shank member, said recess communicating with said top end of said bore which opens thereoutof;

a pair of diametrically opposed identically shaped and configured longitudinally extending slot like grooves disposed along diametric opposite side walls of said bore and extending therealong from said head member recess to a point inwardly of said shank member said grooves defining orienting grooves which lie in the plane defined by said passageways, said bore and said head member recess;

a wedge shaped projection defined at the common juncture point of said innermost ends of said passageways intersecting said bore, said projection having the apex portion thereof aligned with the longitudinal axis of said bore;

a locking pin comprising:

an elongated solid cylindrically shaped rod member having a top end, a bottom end, cylindrical side walls, and being of a diameter less than the diameter of said bore in said shank member;

a rectangular head portion formed integrally with said top end of said rod and being of a generally flat configuration of a size adapted to be received in an orienting manner in said head member rectangular recess upon said locking pin being axially inserted into said bore;

said bottom end of said rod being bifurcated by a slot extending longitudinally along the axis of the rod a short distance inwardly thereof with the bottom end of the rod being divided into a pair of substantially identical longitudinally extending members disposed in side-by-side relationship;

the plane of said slot bifurcating said bottom end being disposed normal to the plane of said head portion;

each of said bottom end members having a terminal end thereof;

a beveled tapered edge defined on the terminal end of each member and sloping inwardly and outwardly from the outer surface of each member to the bifurcating slot;

a pair of diametrically opposed longitudinally extending flange members formed integrally with the side walls of the rod extending from a position adjacent the rod head portion to a position inwardly of said rod;

said flange members defining orienting members which define a plane with said rod longitudinal axis, said plane extending normal to the plane defined by the bifurcating slot and said rod axis;

the plane of said orienting defining flange members extending parallel to the plane of said head portions;

each of said flange members being identical to each other with each having a substantially rectangular cross-sectional area of a size and configuration which is slightly less than the cross-sectional area of the orienting grooves of the shank member so that said flange members may be freely slidably received in said orienting shank member grooves upon said locking pin being inserted into said spike;

said locking pin when inserted into said shank member having said orienting flanges engaged in said orienting grooves with said head portion aligned with said head member recess and with said beveled ends of said bifurcated end members resting on opposite surfaces of said apex in said passageways so as to rest on opposite sides of said wedge shaped projection;

whereby driving the locking pin into said bore will effect the spreading apart of the pair of separate end members by action of said beveled edges against said bottom surfaces of said angular passageways on both sides of said wedge shaped projection such that the terminal ends of said locking pin project outwardly from said passageways in diametrically opposite directions parallel to the plane of said maximum projected head member to securely anchor the spike against forces tending to loosen or withdraw the same.

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**3,865,308**

## SPRAYER-MIXER

**Orvie C. Pringle, 8630-220th, Edmonds, Wash. 98020, and John E. Beheyt, 10021-126, Kirkland, Wash. 98033**

**Filed Sept. 14, 1973, Ser. No. 397,216**

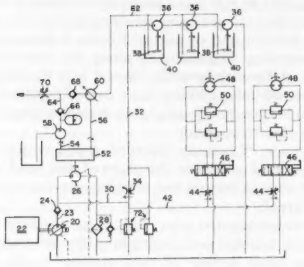
**Int. Cl. B05b 7/26**

**U.S. Cl. 239—61** **3 Claims**

1. A fluid mixing and spraying system comprising a prime mover, a pressure compensated hydraulic pump driven by the prime mover, a hydraulic motor, means interconnecting said hydraulic pump and said hydraulic motor, a gear reducer interconnected to and driven by said hydraulic motor,

a water reservoir, a fixed displacement pump for pumping water from said water reservoir, a chemical solution

reservoir, a variable displacement pump for pumping solution from the solution reservoir, means interconnecting said water pump to said gear reducer, means interconnecting said solution pump to said gear reducer, conduit means interconnecting said water pump and said solution



pump and a spray nozzle attached to said interconnecting conduit to control the discharge from the interconnected pumps whereby the closing of said nozzle terminates the operation of the entire system except for the driving of said pressure compensated hydraulic pump.

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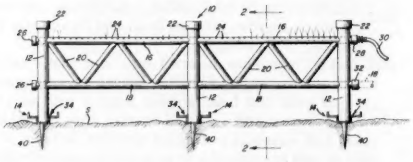
**3,865,309**

## PORTABLE DECORATIVE PLASTIC SPRINKLING FENCE

**Lloyd V. Greenhalgh, Rt. 1, St. Anthony, Idaho 83445**

**Filed Aug. 10, 1973, Ser. No. 387,250**
**Int. Cl. B05b** *9/00*
**U.S. Cl. 239—268** **1 Claim**



1. A sprinkling fence comprising at least one fence unit including, in combination:

a. a plurality of spaced upright posts provided with means for rotatable cradling a rail;

b. means for anchoring the post to a support surface, the means for anchoring including:

i. socket means arranged for receiving a post;

ii. engaging means connected to the socket means for securing same to a support surface; and

iii. pad means mounted on the socket means for facilitating anchoring, the socket means being a cup-shaped receptacle having a bottom wall and cylindrical side wall, the engaging means being a spiked-shaped element centilever mounted on a bottom wall of the receptacle and arranged tapering away therefrom, and the pad means being a pair of oppositely directed longitudinal members cantilever mounted on the side wall and arranged extending longitudinally therefrom, the members terminating in flanges;

c. a pair of spaced rails, one of which rails is rotatably cradled by the means for rotatable cradling, the latter means including holes in the posts for cradling of the one of the rails, similar holes also provided in the posts for cradling the other of the rails, the holes arranged with the rails extending perpendicularly and codirectionally from the post, the one of the rails being a fluid-conducting pipe having spaced ends, and braces connected to the other of the rails and arranged extending between the rails for bracing the one of the rails; and

d. means associated with the one of the rails for dispensing a fluid therefrom, the one of the rails being arranged farther from the means for anchoring than the other of the rails, and the means for dispensing including a plurality of orifices provided in the pipe, and the means for dispensing further including means arranged at the pipe ends for performing one of sealing, connecting a source of fluid, and connecting another rail pipe end to a respective pipe end.

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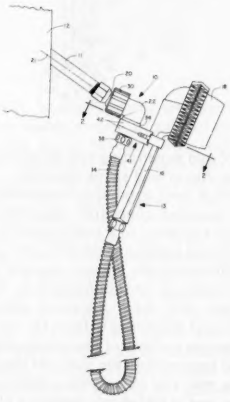
**3,865,310**

## BRACKET ASSEMBLY FOR HAND-HELD SHOWERHEAD

**Christopher W. Elkins, and Donald W. Ruehmann, both of Fort Collins, Colo., assignors to Teledyne Industries, Inc. and Teledyne Aqua Tec Company, both of Fort Collins, Colo.**

**Filed Apr. 12, 1974, Ser. No. 460,303**
**Int. Cl. B05b** *15/06;* **F16b** *2/00*
**U.S. Cl. 239—283** **9 Claims**



1. For use in combination with a hand-held showerhead of the type having an elongate handle, a spray nozzle mounted upon one end of said handle, a flexible water-supply hose attached to the opposite end of said handle, and a stationary water supply pipe, a bracket assembly for coupling said unit to said supply pipe and for detachably supporting said handle upon said supply pipe comprising:

coupling means for connecting said supply pipe to said flexible hose;

support means including a pair of resiliently-flexible support legs mounted upon and projecting outwardly from said coupling means;

a pair of generally C-shaped clamping arms hingedly coupled at one end to each other for movement about a hinge axis to and from a generally O-shaped closed position;

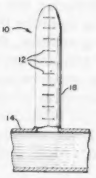
pivot means mounting said arms respectively upon said legs for pivotal movement about respective pivot axes parallel to and equidistant from said hinge axis;

and said legs being capable of resiliently-resisted flexing movement from a normal rest position wherein the distance between said pivot axes is less than twice the distance from one of said pivot axes to said hinge axis to thereby resiliently retain said arms in either of a first over-center position wherein said arms are in said closed position and operable to grippingly support said handle upon said fitting and a second over-center position accommodating removal of said handle from said arms.

## 3,865,311
## QUIET JET DISCHARGE NOZZLE

**Vincent B. Paxhia, Tonawanda, and Franklin B. Bossler, Williamsville, both of N.Y., assignors to Textron, Inc., Providence, R.I.**

**Filed July 10, 1972, Ser. No. 270,180**
**Int. Cl. B05b** *1/14*
**U.S. Cl. 239—568** **7 Claims**



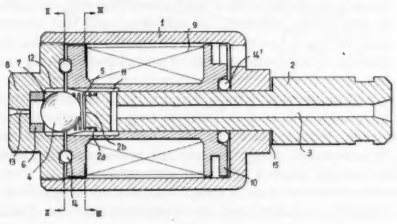
**1.** An inaudible thrust producing discharge nozzle device comprising an externally airfoil-shaped plenum having a trailing edge and air discharge orifice means extending through the wall portion of said trailing edge,

said orifice means including a row of separate orifices of thin slot-like section directing discharge of high speed air jet streams from said plenum rearwardly of said trailing edge and being relatively spaced apart so as to induce flows of air from the ambient atmosphere encasing each high speed discharge jet stream within a non-turbulent sheath of inaudible range vibrating air, thereby masking the audible range sound propogations of said jet streams until they are attenuated and reduced to inaudible levels.

## 3,865,312
## ELECTROMAGNETICALLY OPERATED BALL-TYPE INJECTORS

**Claude Lombard, and Alain Dera, both of Billancourt, France, assignors to Regie Nationale des Usines Renault, Billancourt and Automobiles Peugeot, Paris, both of, France**

**Filed Dec. 26, 1972, Ser. No. 318,637**
**Claims priority, application France, Jan. 6, 1972, 72.00327; Dec. 15, 1972, 72.044846**
**Int. Cl. B05b** *1/30*
**U.S. Cl. 239—585** **11 Claims**

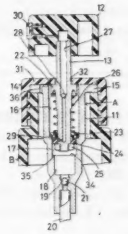


**1.** An electro-magnetically operated injector for fluid injection, especially in internal combustion engines, comprising a protective casing, a core housed in the interior of said casing and having a fluid intake conduit, an excitation coil surrounding said core, a cover, a housing located between the cover and said core and in which is provided a ball for closing a fluid injector outlet located within said cover, said ball being acted upon by said excitation coil in opposition to an elastic system mounted at the front of said core, wherein sections of passage of a fluid upstream of and around said ball and a section of a seating on which the ball rests are several times greater than that of the fluid injector outlet, said passage sections comprising channels, so that the flow rate of the injector depends only little on the lifting of the ball off the seating, on the excitation current and on the restoring force of said elastic system, and wherein an extremity of said core comprises an external shoulder, against which is supported the elastic system acting on said ball, the extremity of said core being flat and perpendicular to the direction of movement of said ball, and the flow of fluid being ensured by the intake conduit and a plurality of grooves around said ball.

## 3,865,313
## PRESSURE ACCUMULATIVE SPRAYER DEVICE

**Hiroshi Kondo, 30-4 Hanazono-cho, Nagasaki, Japan**

**Filed Feb. 7, 1974, Ser. No. 440,538**
**Claims priority, application Japan, Mar. 26, 1973, 48-34909**
**Int. Cl. A62c** *11/02*; **B05b** *9/04*
**U.S. Cl. 239—333** **4 Claims**



**1.** A pressure accumulative sprayer device comprising in combination a valve casing provided with a cylinder chamber and a compression chamber having a shoulder portion in the lower part thereof, said valve casing being so fabricated as to be airtightly mounted on a container; a cap engageable with the valve casing and the container; a plunger the lower end of which is inserted into the valve casing through the cap, the upper end of said plunger being provided with a spray button having a nozzle, the portion of said plunger inserted into the valve casing being provided with a spring receiving seat, and an orifice in a position below said spring receiving seat, and moreover a communication hole thereinside for connecting the nozzle and the orifice with each other; a piston so fitted as to be airtightly slidable between the outer periphery of the plunger and the inner periphery of the cylinder chamber of the valve casing; springs compressively provided between the piston and the spring receiving seat for urging said piston and the plunger; a check valve for checking a counter-current of the liquid within the valve casing but permitting said liquid to travel in one direction; a movable valve slidably fitted to the plunger so as to close the orifice, said valve opening the orifice by permitting the descent of the plunger beyond its lower limit even after its abutment on the shoulder portion of the compression chamber thereby enabling to obtain a spray when the orifice communicates with the interior of the valve casing.

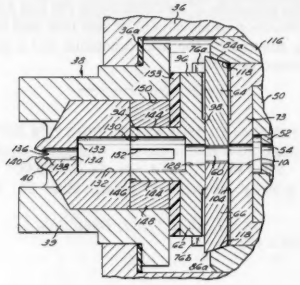
## 3,865,314
## ADJUSTABLE PATTERN SPRAY GUN

**Gustave S. Levey, 6220 Reamer, Houston, Tex. 77036, and Edward Moser, Houston, Tex., assignors to said Levey, by said Moser**

**Filed Feb. 19, 1974, Ser. No. 443,480**
**Int. Cl. B05b** *1/04*
**U.S. Cl. 239—590.3** **40 Claims**

**1.** An airless paint spray gun comprising a body portion having a conduit adapted to be connected at its inlet end to a source of liquid paint under pressure and adapted to have a spray tip connected to the discharge end thereof, a pre-orifice assembly adjacent the discharge end of said conduit including relatively movable members defining therebetween a pre-

orifice opening, and manually operable means carried by said body portion operably connected to said relatively movable



members and movable to vary the area of said pre-orifice opening.

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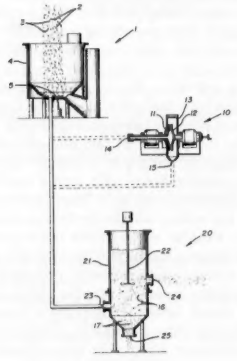
**3,865,315**

**PROCESS FOR SEPARATING FIBROUS MATERIAL**

**James R. Roberts, Palatine, and Stephen G. Nason, Arlington Heights, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.**

**Filed Dec. 15, 1972, Ser. No. 315,399**
**Int. Cl. B02c** *19/12*
**U.S. Cl. 241—4** **3 Claims**



**1.** A process for separating mineral wool fibers from adhered mineral wool shot without substantially destroying the mineral wool fibrous character comprising:

passing a suspension of mineral wool fibers having shot particles adhered thereto in water at a solids consistency of about **4–10** percent through an attrition means having attrition plates set at a distance of about 1/16 to about ¼ inch apart;

passing said suspension to an agitation vessel and adding water to dilute the mineral wool and shot mixture to a consistency of about ¼ percent to about 2 percent by weight;

gently stirring the diluted suspension at a speed of about 30–100 rpm for a time sufficient to free the fibers from the shot; and

continuously decanting, while maintaining agitation, the fibers and a portion of the water from the shot and the remainder of the water.

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**3,865,316**

**PROCESS FOR MILLING DYES WITH STAUROLITE SAND**

**Eugene Fredrick Hartstein, Pennsville, N.J., and Ross Edward Kendall, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 23, 1973, Ser. No. 408,582**
**Int. Cl. B02c** *17/00*
**U.S. Cl. 241—22** **3 Claims**

**1.** In a process for reducing the particle size of a water-dispersed dye comprising agitating the water-dispersed dye in the presence of a grinding medium, the improvement comprising employing, as the grinding medium, ferrous aluminum silicate sand in particle sizes between about 105 to 1,000 microns said ferrous aluminum silicate sand containing more than 50 percent by weight of staurolite having the empirical formula $Fe_2Al_9O_7(SiO_4)_4OH$, said staurolite having a specific gravity of about 3.7 and a Mohs scale hardness of about 7.

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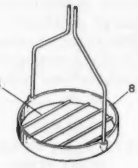
**3,865,317**

**MINI-MASHER**

**Alma Louise Brehm, 1040 E. Ellsworth Ave., Denver, Colo. 80223**

**Filed Mar. 19, 1973, Ser. No. 342,595**
**Int. Cl. A47j** *43/10*
**U.S. Cl. 241—169.2** **1 Claim**



**1.** A potato and vegetable mashing device comprising:

a mashing head including a cylindrical ring-like member having a circular top edge, a circular bottom edge, and cylindrical side walls;

a plurality of spaced apart parallelly disposed tine members each formed of an elongated circular rod with each extending between transversely opposite points disposed about a diametric axis of said cylindrical ring and affixed to said points interiorly of said ring, said tine members each having a line of contact disposed adjacent the plane defined by the bottom edge of said cylindrical ring member;

a pair of diametrically spaced apart flange members formed integrally with said cylindrical ring and projecting outwardly of said exterior surface thereof, said flange members disposed along the diametric axis of said ring normal to the axis of each of said tine members;

a socket defined in each flange member opening out of the top surface thereof and extending thereinto in a direction normal to the plane of said tine members;

a pair of identical generally Z-shaped upright members, each upright associated with one of said sockets and having one end affixed in said associated socket, said uprights extending upwardly from said cylindrical ring to a position spaced thereabove, and then projecting over the area of said ring in a converging manner until disposed adjacent each other substantially bracketing the axis of said ring, from whence said uprights project upwardly therefrom in a direction parallel to said axis; and

a handle member having side walls, a front end, and a back end, said front end having a pair of spaced apart sockets opening thereoutof and extending longitudinally thereinto, said sockets adapted to receive said terminal end portions of said uprights to affix said handle thereto.

## 3,865,318
## ROCKING MILL

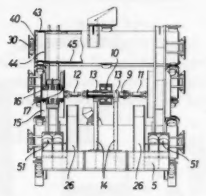
**Hagen Gammerler, 8021 Icking, Icking, and Harald Bohm, 8021 Deining, Deining, both of Germany**

**Filed Apr. 19, 1973, Ser. No. 352,540**

**Claims priority, application Germany, Apr. 21, 1972, 221975**

**Int. Cl. B02c** *17/14, 17/24*

**U.S. Cl. 241—170** **6 Claims**



1. In a rocking mill for grinding solid materials, comprising a bed frame, support plates upstanding from said bed frame, a plurality of grinding tubes containing grinding elements mounted by said support plates, mechanism for oscillating said tubes, and a driving unit for actuating said mechanism, the improvement wherein the driving unit includes a driven part comprising a shaft centrally supported within the area defined by the support plates, cardan half shafts at each end of the shaft, symmetrically disposed with respect to the shaft and drivingly coupled to said mechanism.

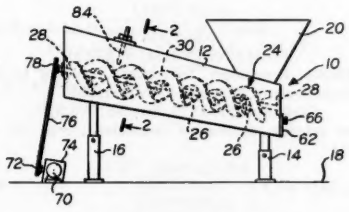
## 3,865,319
## MULTIPLE HELICAL BLADE ROTARY GRINDER FOR LIGHT DENSITY MATERIAL

**Rudolf Hoffman, Oceanside, Calif., assignor to The Rainville Company Inc., Middlesex, N.J.**

**Filed Apr. 25, 1972, Ser. No. 247,387**

**Int. Cl. B02c** *18/14*

**U.S. Cl. 241—188 R** **4 Claims**



1. A rotary grinder including a housing into which is loaded material to be ground up, two relatively fixed shear blades secured to the inside of the housing, a cutter in the housing rotatable about an axis, the cutter having a plurality of helical blades spaced axially around the circumference of the cutter and with edges that move adjacent to the relatively fixed shear blades as the cutter rotates, the two relatively fixed shear blades being on opposite sides of the cutter and one being oriented to shear against a descending cutter blade and the other being oriented to shear against an ascending cutter blade, bearings on which the cutter rotates about said axis, which axis is parallel to the shearing edges of the fixed shear blades, and means for rotating the cutter, characterized by the housing having a bottom immediately below the cutter and sloping upward toward one end, the cutter sloping upward with the bottom and at substantially the same angle as the bottom, the means for rotating the cutter turning it in a direction to thrust the material to be cut in the direction of the higher end of the bottom of the housing, a partition spaced from the higher end of the cutter and extending from one side wall to the other and across the top of the cutter near the high end of the cutter and generally normal to the axis of rotation of the cutter for preventing the material to be cut from being thrust upward to the extreme end of the cutter, and space in the chamber above the cutter in which material thrown upward by the cutter blades can drop back by gravity toward the lower end of the cutter.

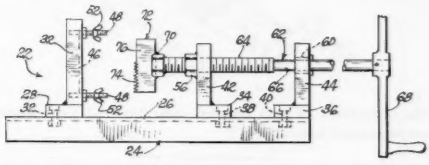
## 3,865,320
## SOIL PULVERIZING DEVICE

**Joseph E. Bowles, 6810 N. Hi-Wood Ct., Peoria, Ill. 61614**

**Filed Jan. 8, 1973, Ser. No. 321,692**

**Int. Cl. B02c** *18/14*

**U.S. Cl. 241—278 R** **5 Claims**



1. In a compaction testing system wherein a compacted soil specimen is obtained in a mold and then pulverized to a fine state, the improvement in a soil pulverizing device comprising:

a base for mounting said mold;

means defined by the mold and complementary means defined by the base for securing the mold in position when the mold is mounted on the base;

a pulverizing blade having a serrated edge portion for contact with said specimen wherein said portion extends for approximately half the length of the blade and wherein the remaining half of the blade edge is bent inwardly to provide both a scraper to remove the loosened soil from the sample face and as an auger whereby material engaged by said blade is driven outwardly of the mold;

means for supporting said blade to accurately align the blade relative to a mold mounted on said base and to position the blade adjacent the mold; and

means for driving said blade whereby the blade rotates relative to the mold, said means supporting the blade including means for simultaneously moving the blade inwardly of the mold for engaging the material therein as the blade rotates whereby the rotation and inward movement of the blade gradually pulverizes the compacted specimen to a fine state.

## 3,865,321
## PNEUMATIC CONTROL SYSTEM FOR USE IN AUTOMATIC YARN TRANSFER SYSTEM

**Harry B. Miller, Hopedale, Mass., assignor to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Karlsruhe, Germany**

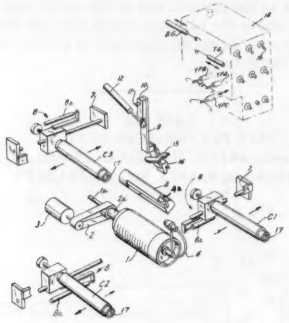
**Filed May 25, 1973, Ser. No. 364,073**

**Int. Cl. B65h** *54/02*

**U.S. Cl. 242—18 A** **5 Claims**

1. In a winder for simultaneously winding at least one yarn or the like which has a drive roll, a plurality of rotatable chucks each movable into and out of driven engagement with said drive roll, a yarn aspirator rotatable to a plurality of positions including three positions in each of which its inlet is located adjacent one of said chucks, and a yarn transfer arrangement for transferring running yarn via said aspirator between respective ones of said chucks, a pneumatic control system including a plurality of pneumatic switches; pneumatic conduits connecting respective ones of said switches with said chucks, aspirator and yarn transfer arrangement; and a plural-

ity of cams associated with respective ones of said switches for operating the same in programmed sequence so as to control



the operations of said chucks, aspirator and yarn transfer arrangement, respectively.

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**3,865,322**

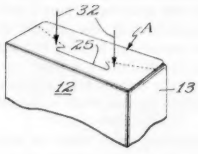
**RECLOSABLE CARTON**

**Russell J. Hennessey, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, Ramsey, Minn.**

**Filed May 17, 1973, Ser. No. 361,173**

**Int. Cl. B65d** *5/54*

**U.S. Cl. 229—51 TC** **5 Claims**




1. A carton closure for a rectangular carton having opposed parallel front and rear panels and opposed side panels, foldably connected in tubular relation,

a first closure flap hinged to the upper edge of one of said front and rear panels and folded into right angular relation thereto,

a second closure flap hinged to the other of said front and rear panels and folded to overlie said first closure flap,

said second closure flap including a locking tab receiving slit intermediate its side edges, and weakened lines of separation extending from the ends of said slot to the side edges of said second closure flap,

means securing the area of said second closure flap between said locking slot and said weakened lines of separation to the underlying area of said first closure flap,

said first closure flap being of a length substantially equal to the distance between said slit and the end extremity of said second closure flap,

said first closure flap including a locking tab in registry with said slit and extending beneath a portion of said second closure flap between said slit and the line of fold connecting said second closure flap to said one of said one of said front and rear panels, whereby

when said second closure flap is split along said weakened lines of separation and said carton opened, said carton may be reclosed by first folding down said second closure flap, and then folding down said first closure flap and inserting said locking tab beneath a portion of said second closure flap.

**3,865,323**

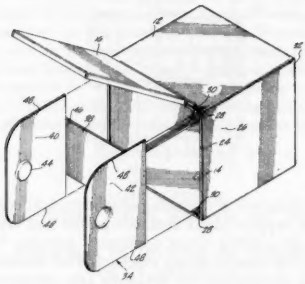
**WATER TIGHT AND MOISTURE PROOF TOILET PAPER CONTAINER**

**David G. Stronge, 421 Montaloo Dr., Bakersfield, Calif. 93309, and Remey Ortiz, 2900 21st St., Bakersfield, Calif. 93301**

**Filed Sept. 27, 1973, Ser. No. 396,064**

**Int. Cl. B65h** *19/00*

**U.S. Cl. 242—55.53** **5 Claims**



1. A water and moisture proof toilet paper container comprising an open faced housing, a lid member pivotally secured to said housing, means for securing said lid member over the open face of said housing, rib means disposed on the interior walls of said housing, said rib means defining a plurality of interior parallel channels, a toilet paper support member having a central portion and a pair of ear members, said ear members being disposed on opposite sides of said central portion and separated therefrom by a pair of folding seams, said ear members being adapted to be bent forwardly of said central portion along said folding seams to define a U-shaped support member adapted to fit about a roll of toilet paper, the extended edges of said ear member being slidably mounted within said parallel channels within said housing and means carried by said ear members for holding said roll of toilet paper.

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**3,865,324**

**FILM UNWINDING SYSTEM**

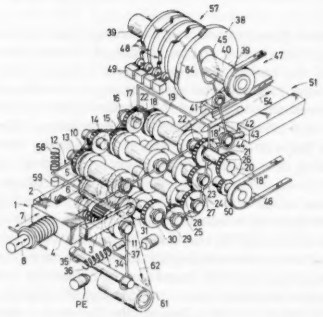
**Erich Binder, Regensdorf, Switzerland, assignor to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Sept. 12, 1973, Ser. No. 396,870**

**Claims priority, application Switzerland, Sept. 22, 1972, 13835/72**

**Int. Cl. B65h** *17/00*

**U.S. Cl. 242—67.1 R** **9 Claims**



1. A system for unwinding a strip of photographic film material wound up into roll form on a film spool which comprises a holder for supporting the film spool with the film

rolled up thereon for rotation, a drive roll engageable with the surface of the roll of film for rotating the latter in the sense of unwinding the film strip, and means for taking up the outer end of the film strip as it is unwound comprising a take-up roll drivable in the same sense of rotation as that of said film roll, and a rotatably mounted draw-off roll resiliently pressed against said take-up roll and establishing a nip therebetween into and through which the wound off outer end of the film strip is led and drawn off.

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**3,865,325**
**FLEXIBLE TAPE REEL**
**William P. Newcomer, Jr., Granada Hills, Calif., assignor to Dylaker Computer Systems, Inc., Van Nuys, Calif.**
**Filed July 2, 1971, Ser. No. 159,113**
**Int. Cl. B65h** *75/00*
**U.S. Cl. 242—68.5** **17 Claims**

**1.** An information recording device comprising in combination:

a flexible, resilient core capable of being folded and bent into a substantially flat position and returning to an expanded position on release of the folding force;

a flexible and foldable, upwardly extending side guide disposed inwardly from each edge of the core forming a central channel, said guide being formed of an upstanding band member including at least one discontinuity formed in the band; and

a length of flexible information recording tape having a width narrower than said core and substantially the width of said channel wound on said core within said channel.

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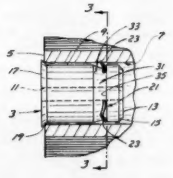
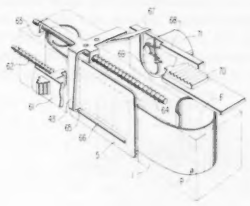
**3,865,326**
**CORE PLUG**
**Andre Beaudoin, Dosquet, Quebec, Canada**
**Filed Oct. 9, 1973, Ser. No. 398,637**
**Int. Cl. B65h** *17/02*
**U.S. Cl. 242—68.6** **7 Claims**



**1.** A plug adapted to be inserted into a cylindrical bore defined by relatively soft material, the plug comprising a cylindrical body, and a plurality of elongate, spaced-apart, resilient holding members extending about the body intermediate the ends of the body, each member attached by its ends to the body, and having a point intermediate its ends projecting radially outwardly from the body, to co-operate with the soft material to hold the plug in the bore, the ends of each member lying in a plane which is substantially perpendicular to the longitudinal axis of the body and a shallow groove extending circumferentially about the body intermediate the ends of the body, the ends of the holding members being attached to the body at or adjacent the base of the groove.

**3,865,327**
**FILM CARTRIDGE**
**Shigeru Oshima, Tokyo, Japan, assignor to Fuji Photo Film Co. Ltd., Kanagawa, Japan**
**Filed Oct. 24, 1973, Ser. No. 409,119**
**Claims priority, application Japan, Oct. 27, 1972, 47-107782**
**Int. Cl. G03b** *1/04*
**U.S. Cl. 242—71.2** **3 Claims**



**1.** In a film cartridge containing photographic film having perforations adjacent at least one edge for a photographic camera having a film advancement mechanism in which a movable claw engages the perforations in the film, said cartridge having a film feed-out chamber from which said photographic film is supplied, and a film receiving chamber into which the film supplied from said feed-out chamber is fed, the improvements comprising: an intermediate connection member connecting and extending between said chambers in front of the film, said intermediate connection member being provided with a groove through which an end of the claw engaging a perforation of the film moves and a separate aperture to allow light to pass therethrough and impinge on said photographic film, said groove and said aperture being located on the same side of said film.

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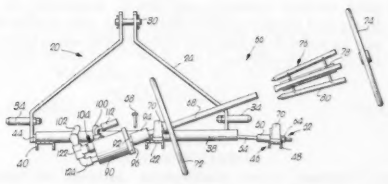
**3,865,328**
**WIRE WINDER**
**Lynn E. Chrisp, Arnold, Nebr., assignor to Chrisp Manufacturing Company, Lincoln, Nebr.**
**Filed Mar. 30, 1973, Ser. No. 346,591**
**Int. Cl. B65h** *75/18*
**U.S. Cl. 242—71.9** **12 Claims**



**1.** A material winder comprising:

a frame;

a winding reel having an axle defining the axis of rotation of the reel;

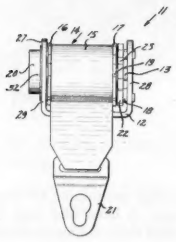
means mounting said reel on the frame for rotation about said axis and for swinging movement between a winding position and a loading position;

a prime mover supported by and operably coupled with said axle of the reel for driving the latter and for swinging therewith during movement between said positions; and a rigid torque member projecting in opposite directions from said prime mover for engagement with adjacent portions of the frame to preclude rotation of the prime mover when the latter is actuated.

## 3,865,329
## INERTIAL LOCKING RETRACTOR

**Wallace C. Higbee, Romeo; Howard A. Wilcox, Imlay City, and Jay W. Jensen, Romeo, all of Mich., assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed June 1, 1972, Ser. No. 258,576**
**Int. Cl. A62b** *35/00;* **B65h** *63/04*
**U.S. Cl. 242—107.4** **9 Claims**



1. An inertial locking retractor comprising:
a frame;
a retractor spool rotatably supported on said frame and on which harness material is retractably stored and from which harness material is withdrawn, and at least one of the end flanges of said spool including ratchet teeth;
a match plate coaxially adjacent said spool and having ratchet tooth configuration substantially identical with said ratchet teeth on said spool and said match plate driven by said spool upon withdrawal of said harness in a normal position where said teeth on said match plate and on said spool are out-of-profile register, and on accelerated withdrawal of harness said teeth are moved to in-profile register; and
a pawl element operably and tiltably supported on said frame and biased toward contact with said ratchet teeth and lockably engaging said ratchet teeth when said teeth are in-profile register.

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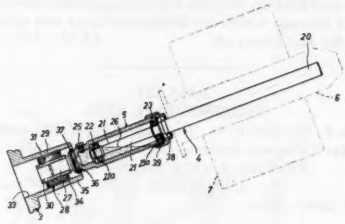
## 3,865,330
## BOBBIN SPINDLE

**Dieter Widmer, Uster, Switzerland, assignor to Spindel-Motoren-und Maschinenfabrik A.G., Uster, Switzerland**

**Filed June 27, 1973, Ser. No. 373,850**
**Claims priority, application Switzerland, July 10, 1972, 10290/72**
**Int. Cl. B65h** *49/02;* **D03j** *5/08*
**U.S. Cl. 242—130** **9 Claims**

1. A spindle, especially an unwinding spindle for yarn, comprising a housing, a spindle shaft, bearings arranged in spaced relationship for supporting the spindle shaft in said housing, a carrier hub, a plug secured to said housing and extending away these from along the axis of the spindle shaft, and an elastically flexible support means for supporting the housing at said carrier hub so as to be movable through a limited bending angle, said elastically flexible support means comprising a bushing formed of elastically flexible material, and first and second rigid sleeve members engaging the bushing at the inside and outside thereof respectively, the bushing



being fixedly supported at its inside by said plug and at its outside by the interior of the carrier hub.

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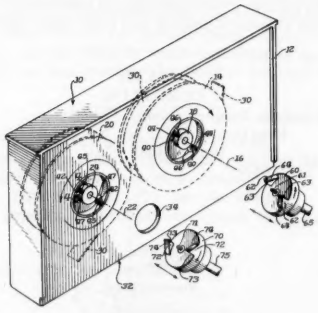
## 3,865,331
## DRIVE INTERFACE SYSTEM

**Raymond E. Clever, Chicago; Kenyon A. Hapke, Libertyville, and Thomas R. Wells, Des Plaines, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.**

**Filed June 28, 1973, Ser. No. 374,283**
**Int. Cl. G03b** *1/04;* **G11b** *15/32, 23/04*
**U.S. Cl. 242—199** **15 Claims**



1. A film driving system for selectively driving a supply of film between a pair of film reels comprising:
a film cassette including a pair of film reels each mounted for rotation about an axis of a reel hub;
drive interface means provided on each reel and accessible from the exterior of said cassette, said interface means comprising an abutment member extending axially from each hub and defining a drive shoulder and a camming shoulder extending in an axial external direction from the associated hub, with the drive shoulder and camming shoulder arranged to converge on each hub; and
an external driving system for engaging said drive interface means to selectively rotate said reels and thereby transport film between said reels, said system including rotatable driving heads adapted to engage said drive shoulders on said interface means to rotate said reels in a selected direction, means to shift said driving heads with respect to said reel hubs between a driving position in engagement with said drive shoulders and a retracted position

disengaged from said drive shoulders and driving means for rotating each of said driving heads in a selected direction at a selected speed, whereby said drive interface means assures positive engagement between said drive heads and drive shoulders when said heads are shifted toward said driving position.

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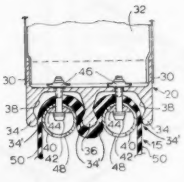
**3,865,332**

## ATTACHMENT FOR AIR CUSHION CONFINING INFLATABLE TRUNK STRUCTURES TO AIR CUSHION SUPPORTED VEHICLES

**Alan V. Coles, Williamsville, N.Y., assignor to Textron, Inc., Providence, R.I.**

**Filed Nov. 1, 1973, Ser. No. 411,704**
**Int. Cl. B64c** *25/10*
**U.S. Cl. 244—102 R** **8 Claims**



1. For use in a surface effect machine, a mechanism for attachment of a flexible/elastic sheet to hard structure of the machine to provide an air cushion type support seal means of the machine, said mechanism: comprising in combination:

a cradle member of trough-like form having opposed ridge-like jaw portions, said cradle member being adapted to be attached to the machine and receive a fold of said sheet; a clamp bar disposed within said fold and dimensioned and disposed to reside in an operative position within said cradle member diametrically between said jaw portions while leaving spacing therebetween and at each side thereof to define a pair of restricted gates through which opposite sides of said sheet pass from within said cradle member, said sheet being pinched between said clamp bar and jaw portions within said gates when said sheet is in an untensioned condition; and

a series of tie members connected to and extending from said cradle member into connections with said clamp bar at intervals along its length so as to maintain said clamp bar in said operative position relative to said cradle member, said tie members being swingable relative to said cradle member so as to permit said clamp bar to sway laterally relative to said jaw portions in response to tensioning of one side of said sheet passing through one of said gates so as to reduce the pinch effect between said clamp bar and one of said jaw portions on said one side of said sheet and to increase the pinch effect between said clamp bar and the other of said jaw portions on the other side of said sheet passing through the other of said gates.

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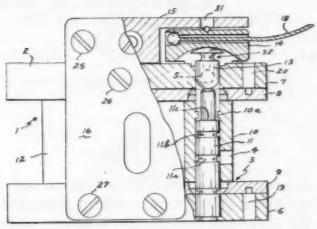
**3,865,333**

## QUICK RELEASE OPEN LINK

**Lawrence E. Fielding, Dayton, and Patrick J. O'Brien, West Carrollton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 5, 1973, Ser. No. 404,060**
**Int. Cl. B64d** *17/38*
**U.S. Cl. 244—151 B** **6 Claims**

1. In a parachute extraction system for airdropping heavy equipment and other cargo loads, an open link-safety rigged to the cargo load to be extracted and comprising; a first, recovery parachute link and first link pin for attachment to the deployment line of a recovery parachute mountable to the top of the cargo load to be extracted; a second, extraction parachute link and second link pin to which one end of the extraction line of an extraction parachute may be attached disposed in nestled relation within the end of said first-named link remote from the said recovery prachute link pin; quick-release means normally providing the sole interconnection and attachment between said first and second links; an extraction link-mounted link-locking means initially disposed in a first, link-open position relative to said second, extraction link pin and selectively adjustable to a second, link-closed position; and mechanically-actuated, link-locking-operating means interconnected with, and automatically moving from a first, inoperative position to a second, operative position to thereby adjust the said link-locking means to the said second, link-closed postiion thereof upon a predetermined movement in an aft direction of the cargo being extracted to thus rigidly inter-



connect said first and second links and the respective recovery and extraction parachute line-attached link pins thereof to thereby deploy the recovery parachute; said link-locking-operating means remaining in its first, inoperative position when a malfunction has occurred prohibiting the said predetermined aft movment of said cargo; said extraction link-locking means comprising a relatively elongated, locking pin adjustably positioned in slidable relation within a longituidnally disposed passage of said second-named link pin; said mechanically-actuated link-locking-operating means comprising a static line attachment cable adapted to be interconnected with one end of a static line slidably attached at its other end to an anchor cable and automatically operative to adjust said locking pin to its econd, closed-link position when said static line is pulled taut on reaching a stop on the said anchor cable.

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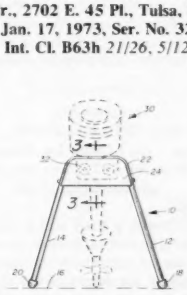
**3,865,334**

## OUTBOARD MOTOR STAND

**A. Logan Wait, Jr., 2702 E. 45 Pl., Tulsa, Okla. 74105**

**Filed Jan. 17, 1973, Ser. No. 324,320**
**Int. Cl. B63h** *21/26, 5/12*
**U.S. Cl. 248—4** **7 Claims**



1. An outboard motor stand comprising:

A U-shaped frame, said frame having a bight portion canted at an angle to depending legs,

a wooden support block adjacent said bight portion of said frame to receive the hinged transom clamp of said outboard motor each of said legs comprising adjustable

telescopic tubes and means to releasably fix said tubes in a desired position, and

resilient tips at each end of each leg of said frame.

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**3,865,335**

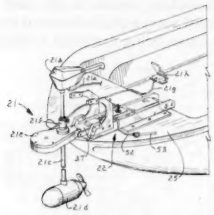
## BOW BRACKET MOUNTING FOR AN ELECTRIC TROLLING MOTOR

**William G. Roller, Purdy, Mo. 65734, and Emery L. West, Oklahoma City, Okla., assignors to said Roller, by said West**

**Filed Aug. 31, 1973, Ser. No. 393,324**

**Int. Cl. B63b** *17/00*; **B63h** *21/26*; **F16m** *1/02*

**U.S. Cl. 248—4** **5 Claims**



1. A bracket for mounting on a boat an outboard motor having an elongate shaft with a water submergible propeller unit on the lower end thereof, said bracket comprising:

a base attachable to said boat;

an upstanding propeller unit holding assembly mounted on said base and adapted to hold said propeller unit in an out-of-water storage position, said assembly including a pair of upstanding C-shaped members, one of which being disposed on each side of the elongate motor shaft, having a cushioningly padded exposed edge to protectively receive the propeller unit in the storage condition; a pivot arm hingedly connected to said base;

a motor shaft retaining member mounted on said pivot arm for limited pivotal movement with respect thereto and adapted to adjustably hold the elongate shaft of said motor;

a releasable latch connected to said pivot arm and engageable with said retaining member for locking the position of the retaining member with respect to said pivot arm;

said bracket being positionable to an operating condition whereby said latch locks the retaining member to the pivot arm and said pivot arm carries the shaft of the motor in a substantially vertical orientation and being further positionable, upon release of said latch, to a storage condition whereby said pivot arm rotates from said operating condition to carry the shaft of the motor in a substantially horizontal orientation with said propeller unit securely held by said propeller unit holding assembly.

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**3,865,336**

## BRACKET AND SHELF SUPPORT ASSEMBLY

**James H. Robertson, 11811 Cedar Ln., Kingsville, Md. 21087**

**Filed Mar. 30, 1973, Ser. No. 346,645**

**Int. Cl. A47b** *57/00*

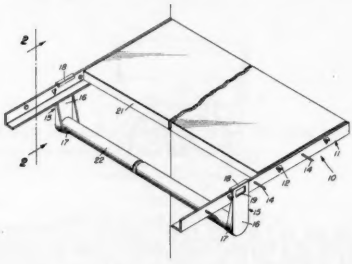
**U.S. Cl. 248—235** **3 Claims**

1. In combination with a shelf and a rod support element, a combination shelf and rod supportive apparatus comprising:

shelf supporting means attachable to spaced portions of a structure for receiving the edges of the shelf to support the shelf in a substantially horizontal position, the shelf supporting means comprising bars having L-shaped cross-sections;

means for attaching the shelf supporting means to the structure;

a bracket having a flat base portion terminating at its upper end in a U-shaped fold and having at its lower end an arcuate ledge for receiving one end of the rod support element therein, the ledge having side portions which taper outwardly from an intermediate section of the flat base portion of the bracket to a maximum at the lower edge of the bracket, the supportive apparatus comprising at least two of the brackets held in spaced relation from each other by the shelf supporting means, thereby to allow the rod support element to be positionable within the brackets after initial installation of the brackets between the spaced portions of the structure and the shelf means, that portion of the flat base lying between the fold and the ledge being held between the spaced portions of the structure to which the shelf supporting means are secured and the shelf supporting means itself, the U-shape fold engaging the upper portion of the shelf supporting means and thus being held thereon, the ledge on the brackets oppositely facing each other to support the rod support element therebetween, the brackets being



held in position by the attachment of the shelf supporting means to the spaced portionis of the structure, the flat base portion of each bracket being disposed between the structure and the shelf supporting means and being formed with an opening; and

fastening means on the shelf supporting means and extending into engagement with the structure through the opening to limit relative movement of the bracket between the structure and the shelf supporting means, one each of the aforesaid bars of the shelf supporting means being attachable to the spaced portions of the structure, the horizontal legs of the bars receiving the shelf thereon and the vertical legs of the bars holding the brackets respectively against the spaced portions of the structure, the U-shaped fold on the brackets receiving a portion of the upper perimetric edge of the vertical leg of the bar, thereby to secure the brackets to the bars.

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**3,865,337**

## SHELVING ARRANGEMENT OR THE LIKE

**Keivan Towfigh, Medford, and Douglas E. Ritchie, Chelmsford, both of Mass., assignors to Rangine Corporation, West Medford, Mass.**

**Continuation-in-part of Ser. No. 211,943, Dec. 27, 1971, abandoned. This application Feb. 22, 1973, Ser. No. 334,852**

**Int. Cl. A47g** *29/02*

**U.S. Cl. 248—246** **7 Claims**

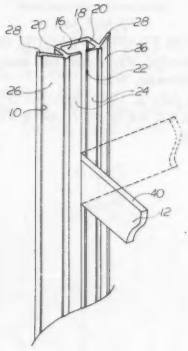
1. A supporting structure comprising:

an elongate standard defining a longitudinal channel having a rear wall, a pair of spaced side walls extending forwardly from said rear walls, said channel having a forwardly facing restricted opening formed along its length and at the forward region thereof, said restricted opening being defined by a pair of flanges extending inwardly toward each other from the forward edge of said side walls;

means enabling said standard to be secured in an upright position without presenting any obstruction to said channel;

a bracket having an inner connective end and an upper supporting surface at least along a portion of its length, said inner end of said bracket being receivable within said restricted opening to enable the inner edge of said bracket to abut the rear wall of said channel at least when said bracket is connected to said standard and extends therefrom in a member-supporting configuration; and

a pin connected to and extending transversely through said bracket, said pin being spaced from that region of the




inner edge of said bracket which abuts the rear wall of said channel in an amount greater than the distance between said rear wall to the rearwardly facing surface of said flanges such that when said bracket is in said member supporting configuration with the inner bracket edge abutting said rear wall of asid channel, the transversely extending ends of said pin will bear forwardly and will be wedged against the rearwardly facing surfaces of said flanges.

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**3,865,338**

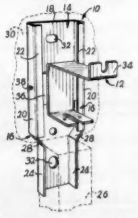
## FLOATING METER MOUNT

**Max L. Campbell, Topeka, Kans., assignor to Hydro-Flex Corporation, Inc., Topeka, Kans.**

**Filed Oct. 4, 1973, Ser. No. 403,537**

**Int. Cl. A47f** *5/00*

**U.S. Cl. 248—295** **9 Claims**




**1.** A floating mount for a ground-supported article requiring freedom from canting and angular heaving such as caused by seasonal variations in soil conditions, said mount comprising:

a normally upright guide member adapted for attachment to a stable object adjacent said article and having an elongated, rectilinear track normally extending in a substantially vertical direction;

a follower element adapted for attachment to said article and reciprocable along said track only longitudinally thereof; and

means for releasably retaining said element in a preselected position along said track intermediate the opposed ends thereof only until attachment of the element to the article,

said element normally being freely reciprocable along a single rectilinear path of travel along said track in either an up or down vertical direction from said preselected position after said article is attached to said element and said retaining means are released whereby to permit vertical floating movement of said article relative to said member in response to changing soil conditions, but preclude deviant canting or heaving of the article during such vertical movement.

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**3,865,339**

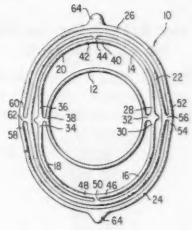
## CONTAINER SUPPORT

**Raymond D. Von Alven, San Rafael, Calif., assignor to Cutter Laboratories, Inc., Berkeley, Calif.**

**Filed Apr. 23, 1973, Ser. No. 353,373**

**Int. Cl. A61b** *19/00*

**U.S. Cl. 248—318** **16 Claims**




**12.** The container support of claim **11** wherein said inner support means includes a cap member for engaging one end of said container.

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**3,865,340**

## SUPPORT APPARATUS

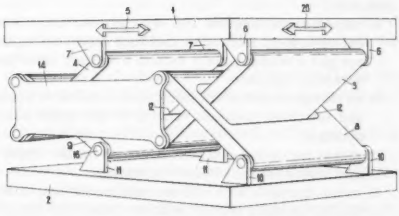
**Stafford Malcolm Ellis, Maidstone, England, assignor to Elliott Brothers (London) Limited, Essex, England**

**Filed Oct. 2, 1973, Ser. No. 402,743**

**Claims priority, application Great Britain, Oct. 4, 1972, 45737/72**

**Int. Cl. F16m** *13/00*

**U.S. Cl. 248—399** **7 Claims**




**1.** An apparatus for supporting a first body on a second body so that relative movement between the two bodies is permitted in three mutually perpendicular directions only, comprising

I. a first parallel motion linkage comprising

A. at least two substantially rigid parallel members each connected at one end with the first body so as to be pivotable about respective spaced apart axes,

II. a second parallel motion linkage comprising
A. at least two substantially rigid parallel members each connected at one end with the second body so as to be pivotable about respective spaced apart axes,
III. all said axes being parallel to one another, and
IV. a third parallel motion linkage comprising
A. a pair of substantially rigid parallel members each connected with the other ends of all the members of the first and second parallel motion linkages so that at each connection between a member of said third linkage and a member of said first or second linkage, relative pivotal movement is possible
i. about one axis parallel to said first and second linkage axes and
ii. about another axis perpendicular to said one axis and parallel to planes containing said first linkage axes and said second linkage axes respectively.

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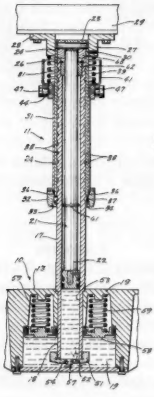
**3,865,341**

## DENTAL STOOL FOR DENTIST AND DENTAL ASSISTANT

**George A. Fortnam, Des Moines, and Ivan E. Sams, Indianola, both of Iowa, assignors to Den-Tal-Ez Mfg., Co., West Des Moines, Iowa**

**Filed Aug. 8, 1973, Ser. No. 386,602**
**Int. Cl. F16m *11/00***
**U.S. Cl. 248—404** **5 Claims**



**1.** In a dental stool including a base assembly, and a seat structure:
a. means supporting the seat structure for adjustable vertical movement relative to said base assembly including an upright cylinder rigidly mounted on said base assembly centrally thereof,
b. an elongated piston for said cylinder movable to extended and retracted positions relative to the upper end of said cylinder,
c. means mounting said seat structure on the upper end of said piston for movement therewith,
d. means movable with and secured to said seat structure in a concentrically spaced relation about said piston having an inner peripheral surface in bearing engagement with the outer peripheral surface of said cylinder,
e. coacting means on said cylinder and on said movable means for releasably mechanically locking said movable means against movement longitudinally of said cylinder to hold said seat structure in a vertically adjusted position, and to rotatably support said movable means on said cylinder when the seat structure is in an adjusted position,
f. means for releasing and actuating said coacting locking means including a manually operated lever pivotally supported on said seat structure,
g. a source of fluid under pressure on said base assembly in fluid communication with said cylinder, and
h. means for controlling the rate of fluid flow to and from said cylinder to vary the rate of retraction of said piston relative to the rate of extension thereof so that when the coacting locking means is released the seat structure with a person seated thereon is movable downwardly at a slower rate than the upward rate of movement thereof without a person seated thereon.

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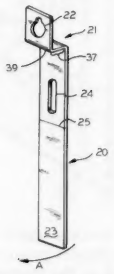
**3,865,342**

## SUPPORT FOR FRAME, PLAQUE, OR THE LIKE

**James C. Kanzelberger, Riverside, Ill., assignor to Contemporary, Inc., Manitowoc, Wis.**

**Filed July 2, 1973, Ser. No. 375,716**
**Int. Cl. A47g *1/17*; A47b *97/04***
**U.S. Cl. 248—470** **10 Claims**




**1.** A frame or plaque support comprising a strap having a first end with a hole for hanger support, a second end opposite the first end which may be bent away from the frame or plaque to allow easel support thereof, and an opening intermediate the two ends for receiving a holding means which lockingly secures the strap to the frame or plaque, said strap being adapted to be rotated off-center in either a clockwise or counterclockwise direction and to be locked in the rotated off-center position by said holding means to compensate for any unbalance of said frame or plaque.

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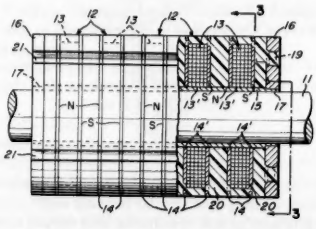
**3,865,343**

## MOLD ASSEMBLY FOR MAKING A MAGNETIC BASE

**William A. Jenkins, Englewood, Ohio, assignor to Monarch Marking System Company, Dayton, Ohio**

**Division of Ser. No. 87,673, Nov. 9, 1970,. This application Dec. 6, 1973, Ser. No. 422,400**
**Int. Cl. B22d *19/00***
**U.S. Cl. 249—95** **11 Claims**




**1.** A mold assembly for making a cylindrical magnetic base having a cylindrical member and spaced apart magnetic circuit means disposed on the cyclindrical member, said mold assembly comprising: mold sections positioned to provide a mold cavity, a pair of end plates disposed at opposite ends of the mold sections for closing off the ends of the cavity, means provided at the inner surface of at least one of the mold sec-

tions for locating the magnetic circuit means at predetermined positions lengthwise of the mold cavity, wherein the locating means comprises spaced apart grooves in at least the one mold section for receiving the magnetic circuit means and holding them in spaced apart relationship while the mold is being filled, means for holding the end plates and mold sections together, the cylindrical member and the magnetic circuit means being disposed in the cavity, and means including a nozzle extending lengthwise of the mold cavity for introducing moldable material into the mold cavity around the cylindrical member and the magnetic circuit means.

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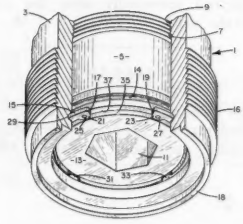
**3,865,344**
**RETAINING RING**
**Richmond S. Hayes, Jr., Fayetteville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**
**Filed Oct. 25, 1972, Ser. No. 301,699**
**Int. Cl. F16k** *51/00*
**U.S. Cl. 251—284** **2 Claims**



**1.** The combination comprising:
a valve body having a threaded cylindrical bore and a groove formed near one end of said bore;
a cylindrical valve stem having external threads in engagement with the threads of said cylindrical bore and a section of reduced diameter at one end of said stem defining a shoulder; and
a generally flat, flexible open retaining ring having inner and outer peripheral surfaces and at least three radial gripping fingers extending from the inner peripheral surface, the outer peripheral surface being disposed in said groove of the valve body and the gripping fingers being in opposing alignment with said shoulder, said gripping fingers engaging said shoulder and countering the exertion of torque on the second member when the first member is moved against the ring.

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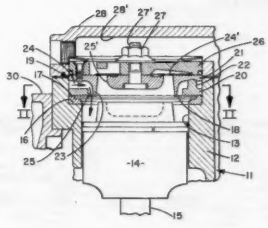
**3,865,345**
**VALVE PLATE FOR RECIPROCATING COMPRESSOR**
**Tadek M. Kropiwnicki, Syracuse, N.Y., assignor to Carrier Corp., Syracuse, N.Y.**
**Filed June 4, 1973, Ser. No. 366,911**
**Int. Cl. F04b** *39/10*
**U.S. Cl. 251—367** **11 Claims**

**1.** A valve plate for use in a reciprocating gas compressor comprising:
a. a first member having a plurality of upstanding members extending normal to a first surface thereof; and
b. a second member having a first surface connected to the top of said upstanding members, said respective surfaces of said first and second members being maintained in spaced relationship to define therebetween a first radially extending flow path for said gas, said second member including a first portion integrally connected to said first surface, extending substantially normal thereto, and being in spaced relationship to an inboard edge of said first member to define therebetween a second longitudinally extending flow path for said gas, the direction of flow of said gas being changed by approximately 90° by contacting the surface defining the junction of said first portion of said second member and said first surface thereof, the gas passing from said first flow path into said second flow path.



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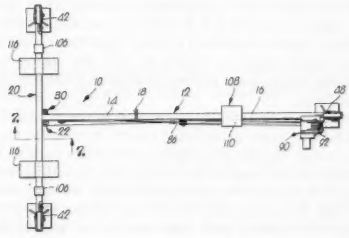
**3,865,346**
**PORTABLE VEHICLE LIFT**
**Gerrel L. Shirk, 723 E. 4th, Newton, Kans. 67114**
**Filed Nov. 30, 1973, Ser. No. 420,683**
**Int. Cl. B66f** *7/02*
**U.S. Cl. 254—89 R** **13 Claims**



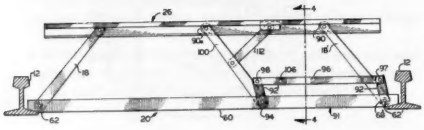
**1.** A portable vehicle lift including:
a T-shaped frame having a single longitudinal beam normally extending fore-and-aft of the vehicle being lifted and a crossbeam normally extending transversely of the supported vehicle,
said longitudinal beam being disposed midway between the opposite ends of said crossbeam and in perpendicular relationship therewith;
a stanchion at each of the three exposed ends of said beams respectively,
each stanchion supporting its corresponding beam end for vertical reciprocation;
power apparatus operably intercoupling said stanchions and the beams for raising and lowering the frame; and
a set of adjustable carriage units on said frame for engaging the underside of the vehicle during lifting of the latter,
a pair of said units being shiftable along said crossbeam on opposite sides of said longitudinal beam into any of a number of selected positions, and a third unit being shiftable along said longitudinal beam toward and away from said crossbeam into any one of a number of selected positions.

**3,865,347**

## APPARATUS FOR UNLOADING BULK MATERIAL

**Hugh H. Pase, Cheshire, Conn., assignor to Mimco Incorporated, Meriden, Conn.**

**Filed Nov. 17, 1972, Ser. No. 307,445**
**Int. Cl. B66f** *3/00*
**U.S. Cl. 254—124** **7 Claims**



1. In a lifting assembly having a fixed frame defining a plane, at least one pair of oppositely disposed lifting arms of equal length, each of said arms being pivotally mounted at one end to said fixed frame and having a free end, a movable platform supported on the free ends of said lifting arms and movable thereby from a position substantially within said plane to an elevated position above said plane, and a power cylinder operatively connected at one end to one of said lifting arms and at its other end to the opposite one of said lifting arms for pivoting said lifting arms in opposite directions upon actuation of said power cylinder,

leveling means for equalizing the pivotal movement of each of said lifting arms comprising in combination therewith, at least one leveling arm disposed parallel to one of said lifting arms and pivoted to said fixed frame, said leveling arm being equal in length to said one lifting arm and having a free end in sliding engagement with said movable platform,

a first torque link rigidly connected to said one lifting arm at a fixed angle thereto for pivotal movement therewith, a second torque link rigidly connected to said leveling arm at a fixed angle thereto equal to said firstmentioned angle for pivotal movement with said leveling arm, and

a tie-bar pivotally connected to said torque links parallel to said fixed frame, such that said tie-bar, torque links and fixed frame form a parallelogram,

said angles between said torque links and their respective arms being such that when said lifting and leveling arms are disposed substantially within said plane of said fixed frame, said links extend outward of said plane.

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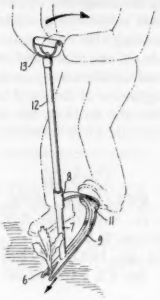
**3,865,348**

## WEED PULLER

**Olive H. Close, 9375 Alta Loma Dr., Alta Loma, Calif. 91701**

**Filed Jan. 28, 1974, Ser. No. 437,362**
**Int. Cl. B66f** *3/00*
**U.S. Cl. 254—132** **1 Claim**

1. A weed puller, comprising: an elongate, substantially straight post portion; an arcuately curved portion having a first end joined to one end of the post portion and extending laterally thereform and curving inwardly toward the post portion and extending substan- tially straight at its other end beyond the other end of the post portion and joined to said other end of the post portion at an angle relative to the axis of the post portion and having a notch in the end thereof for engagement with a weed; laterally enlarged foot pad means on the curved portion between the ends thereof to aid in positioning the notched end relative to a weed; and an elongated handle extending axially from said one end of the post portion whereby the notched end may be engaged with a weed and the



puller then rocked rearwardly upon the curved portion thereof to pull the weed.

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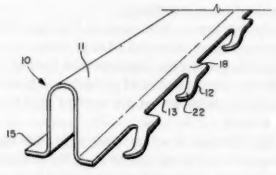
**3,865,349**

## FENCE DROPPER

**Gordon Francis Leiblich, Kimba, Australia**

**Filed May 21, 1973, Ser. No. 361,993**
**Claims priority, application Australia, May 23, 1972, 9049/72**
**Int. Cl. E04h** *17/20*
**U.S. Cl. 256—47** **4 Claims**



1. A fence dropper having a body portion arranged to extend rearwardly away from the plane of a fence when supported by the dropper, a flange extending along at least one edge of the body portion, a plurality of tongues spaced from one another and lying beyond the outer edge of said flange, each tongue having at its root a bridge portion joining it to but spacing it from said flange outer edge and extending forwardly of said plane from said root, each tongue being of identical size and shape, the recess formed between a said tongue and the edge from which it is spaced by said root and also between that said tongue and an adjacent said tongue has its size and shape identical to the tongue size and shape, said tongue further having a return portion which terminates rearwardly of said plane to thereby define with said body portion a wire retaining aperture extending across said plane of the fence.

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**3,865,350**

## LIQUID HOMOGENIZING DEVICE

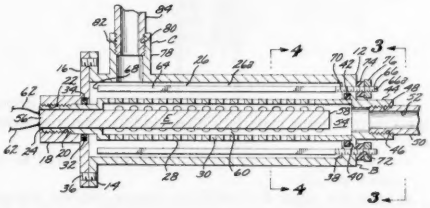
**Wilson A. Burtis, 5011 Harvard Ave., Westminster, Calif. 92683**

**Filed Jan. 14, 1974, Ser. No. 433,215**
**Int. Cl. B01f** *5/08, 11/02*
**U.S. Cl. 259—1 R** **5 Claims**

1. A device for transforming a multi-phase liquid into a substantially homogeneous liquid that includes:

a. an elongate housing having first and second closed ends, said housing defining a confined space within the interior thereof;

b. an elongate ultrasonic wave generating assembly disposed at least partially in said confined space and supported in a substantially fixed position in said housing to extend from said first end to a position adjacent said second end, and said assembly when so supported having the portion thereof in said confined space free to vibrate;
c. first means for vibrating said assembly in an ultrasonic range;
d. a tubular shell in said confined space of greater internal transverse cross section than the transverse cross section of the portion of said assembly in said housing, said shell enveloping said portion of said assembly in said housing, and extending from said first end to said second end and in communication with a liquid inlet in the latter, and said shell having a plurality of longitudinally and circumferentially spaced apertures therein;
e. a plurality of elongate, circumferentially sapced reeds disposed in said confined space that have first and second



ends, said first ends of said reed secured to said second end of said housing, said reeds being substantially parallel to one another and located between said housing and said shell, and said reeds being of such length and formed from a material possessing resiliency to the extent that said reeds will resonate when said assembly is vibrated; and
f. liquid outlet means in said shell adjacent said first end thereof, with said multi-phase liquid when discharged through said liquid inlet entering an annulus shaped space defined between said assembly and shell to be subjected to ultrasonic vibration by said assembly prior to flowing out of said shell as a plurality of streams through said apertures to be further subjected to ultrasonic vibration by said reeds as they resonate, and said liquid being transformed to a homogeneous state as a result of said vibrations of said assembly and reeds prior to flowing from said liquid outlet means.

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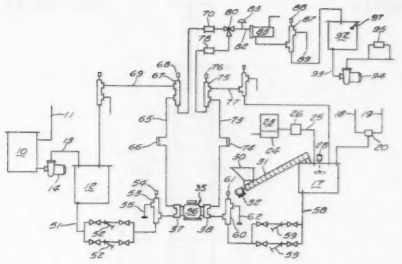
### 3,865,351
### PICKLE MANUFACTURING

**Francis Glenn Connick, Downers Grove, Ill., assignor to Swift & Company, Chicago, Ill.**

**Division of Ser. No. 94,064, Dec. 1, 1970, Pat. No. 3,717,479. This application Dec. 8, 1972, Ser. No. 313,586**
**Int. Cl. G05d** *11/02;* **B01f** *3/12*
**U.S. Cl. 259—4** **9 Claims**

1. An improved apparatus for manufacturing a curing pickle solution, said apparatus comprising: a first brine storage tank; a second storage tank for liquid sugar or dextrose, said second storage tank having a heating means connected thereto; a mixing tank connected to receive liquid from said second storage tank and water from a supply thereof; delivery means positioned for adding additional ingredients into said mixing tank; metering means connected to said first brine storage tank and to said mixing tank, said metering means being operable to separately withdraw and regulate streams of liquid from each of said first brine storage and mixing tanks; and



flow means connected to said metering means to combine said streams into a single flow.

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### 3,865,352
### STATIC MIXING DEVICE

**Charles Edward Nelson, White Bear Lake, and Clifford L. Jewett, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.**

**Filed Nov. 16, 1973, Ser. No. 416,604**
**Int. Cl. B01f** *5/00*
**U.S. Cl. 259—4** **4 Claims**

1. A static device for mixing a plurality of fluids comprising: a hollow cylindrical tube having an inlet and an outlet; and a plurality of shaped pieces filling said tube, said pieces comprising a circular disc having perpendicularly attached thereto at least one projection, the diameter of said disc being about 0.25 to 0.9 times the inner diameter of said tube and the length of said projection being about 0.25 to 0.75 times the inner diameter of said tube.

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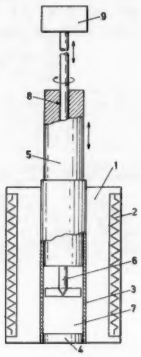
### 3,865,353
### MIXER FOR HIGHLY VISCOUS FLUIDS

**Edgar Fischer, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Nov. 21, 1972, Ser. No. 308,422**
**Claims priority, application Germany, Nov. 23, 1971, 2158002**
**Int. Cl. B01f** *7/22*
**U.S. Cl. 259—118** **3 Claims**

1. A mixing device for highly viscous fluids comprising a hollow elongated tube having first and second open end portions and defining a mixing space therein, a stationary piston removably mounted in a fixed position closing said first open end portion of the tube and a movable piston slidably mounted in and closing the second open end portion of the tube for movement through said mixing space; said movable piston having an axial bore formed therethrough; and a stirrer having an elongated shaft extending through said bore into said mixing space and having a mixing member thereon in the mixing

space; whereby said movable piston is adapted to rest on the material to be mixed in said mixing space to maintain a relatively constant volume therein and prevent formation of gas spaces in the mixing space.



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**3,865,354**

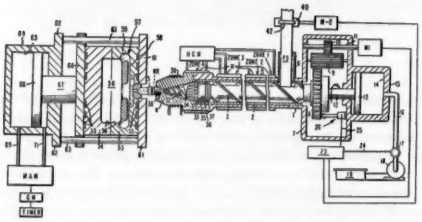
**APPARATUS**

**John Samuel Burpulis; Robert David Souffie, both of Wilmington, Del.; John D. Counceller, Mt. Gilad, and Robert De Capite, Worthington Hills, both of Ohio, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 235,491, March 17, 1972, abandoned. This application Sept. 17, 1973, Ser. No. 397,721**

**Int. Cl. A21c** *1/106*

**U.S. Cl. 259—191** **7 Claims**



**1.** In a reciprocating screw injection molding apparatus that includes a reciprocable rotatable driven screw and an elongated housing surrounding the screw, said housing having an outlet adjacent one end and an inlet adjacent the other end of the screw, and wherein an elastomeric material is first fed through said inlet according to the demand of the screw, a feed mechanism for a flat strand material comprising: said inlet defining a feed passage transverse to the longitudinal axis of the housing, said passage being smoothly faired into the normal cross section of said housing in the direction of screw rotation; a material deflection member extending into said feed passage substantially the entire length thereof and less than the width thereof, said member engaging the upstream wall of said passage; a roll driven by a motor located directly above said inlet and engaging said flat strand to feed said strand into said inlet in a vertical path at a fixed velocity, said motor being coupled to a control means which actuates the motor in response to the screw rotation, and said strand having sufficient stiffness to lift itself from said roll when the demand is less than the feed velocity and to lower itself onto the roll when the demand catches up with the feed velocity.

**3,865,355**

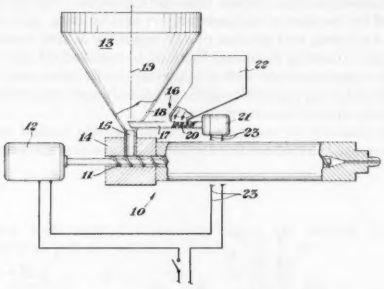
**MEANS FOR PUTTING ADDITIVE IN PLASTIC AND OTHER MATERIALS**

**Thomas J. Eau Claire, 4181 Richmark Ln., Bay City, Mich. 48706**

**Filed Apr. 23, 1973, Ser. No. 353,819**

**Int. Cl. B01f** *7/08*

**U.S. Cl. 259—192** **11 Claims**



**1.** A screw extruder for homogeneously mixing and extruding a thermoplastic material with an additive material including:

a feed hopper for feeding thermoplastic material to the screw extruder;

at least one auger feed tube for feeding additive material into the feed hopper;

said at least one auger feed tube extending substantially horizontally through the lower part of the sidewall of the feed hopper above and adjacent to the screw of the extruder;

the upper side of said at least one auger feed tube at its distal end extending beyond the lower side thereof and said lower side terminating along a line extending approximately horizontally along said lower side and substantially passing through the vertical axis of said feed hopper; the point of termination of said at least one auger feed tube being between a distance from said axis towards the in-feed sidewall equal to about one-seventh of the diameter of the feed passage in said hopper to a distance beyond said vertical axis equal and about one-tenth of said diameter in a direction away from said in-feed sidewall; said diameter being the diameter of the hopper section at the level of the auger feed tube.

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**3,865,356**

**HYDRAULIC SHOCK ABSORBER**

**Felix Wossner, Schweinfurt am Main, Germany, assignor to Fichtel & Sachs AG, Schweinfurt am Main, Germany**

**Filed June 14, 1973, Ser. No. 370,043**

**Claims priority, application Germany, June 20, 1972, 2229945**

**Int. Cl. F16f** *5/00*

**U.S. Cl. 267—139** **11 Claims**

**1.** A shock absorber for use between a bumper and the frame of an automotive vehicle comprising:

a. a cylinder having an axis and bounding a cavity therein;

b. a piston axially movable in said cylinder and axially separating a first and a second compartment of said cavity;

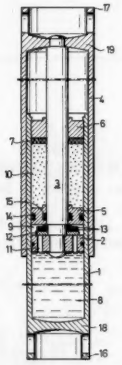
c. a piston rod fastened to said piston in said cavity and axially extending outward of said cylinder;

d. fastening means for respectively fastening said cylinder and said piston rod to said bumper and to said frame respectively;

e. a liquid substantially completely filling said compartments;

f. normally closed throttling valve means responsive to movement of said piston rod in a direction inward of said cylinder under a predetermined axial force applied by said fastening means for opening a throttling passage between said compartments;

g. partition means axially movable in said cylinder and separating one of said compartments from a chamber in said cavity;



h. a body of gas substantially filling said chamber under a pressure sufficient for biasing said piston rod outward of said cavity in at least one axial position of said piston rod with a force smaller than said predetermined force; and

i. force transmitting means for transmitting to said cylinder an axial force applied to said piston rod in said inward direction and smaller than said predetermined force.

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**3,865,357**

## MULTIPLE SPRING ASSEMBLY

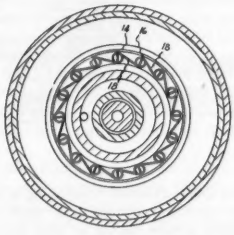
**Frederick Charles Drummond, Fairfield, N.S.W., Australia, assignor to Borg-Warner (Australia) Limited, Fairfield, New South Wales, Australia**

**Filed Aug. 13, 1973, Ser. No. 388,297**

**Claims priority, application Australia, Aug. 17, 1972, 45674/72**

**Int. Cl. F16f** *3/04*

**U.S. Cl. 267—91** **3 Claims**



1. A spring device formed by a continuous strand to provide a series of helical coils interconnected by integral portions of the strand, each of said helical coils having a longitudinal axis and said coils being disposed such that said axis is generally perpendicular to the plane of said interconnecting strand portions, said device being in the shape of an annulus whereby said axis is generally perpendicular to the plane of said annulus.

**3,865,358**

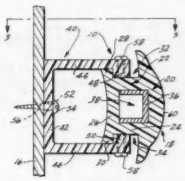
## DENT DEFLECTOR FOR MOBILE HOMES

**Jeff A. Butters, 10355 Armenta St., Sun Valley, Calif. 91352**

**Filed Nov. 29, 1972, Ser. No. 310,258**

**Int. Cl. F16f** *1/36*

**U.S. Cl. 267—140** **6 Claims**



1. A device for protecting mobile homes and the like from impact damage comprising:

an elongated guard rail member made from a deformable material for providing an impact-absorbing, elongated front section thereof and having an elongated reinforcing member to provide rigidity for the length of the deformable guard rail member,

an elongated connecting member formed integrally with a base portion of the guard rail member and projecting rearwardly away from the impact-absorbing front portion thereof, the connecting member being continuous for a substantial portion of the length of the guard rail member, a plurality of generally U-shaped mounting members each including a base portion with a pair of spaced apart legs extending forwardly from the base portion, the legs of each mounting member including separate locking means for engaging the continuous connecting member of the guard rail in a releasable interlocking fit for attaching the mounting members to the connecting member in a spaced apart relation along the length of the guard rail, with each mounting member being releasably attached at locations on the connecting member independently of the locations of the other mounting members,

the legs of each mounting member being elongated to, in normal use, hold the guard rail member spaced a substantial distance forward from the base portions of the several mounting members,

fastening means cooperating with the base portion of each mounting member for securing the guard rail member to the mobile home, and

separate fastener members extending through the legs of each mounting member to rigidly secure the legs to the connecting member.

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**3,865,359**

## VACUUM APPARATUS

**Italo Caroli, Westmount, Quebec, Canada, assignor to DBM Industries Ltd.**

**Continuation-in-part of Ser. Nos. 249,142, May 1, 1972, abandoned, and Ser. No. 286,661, Sept. 6, 1972, abandoned. This application Sept. 5, 1973, Ser. No. 394,526**

**Int. Cl. B25b** *11/00*

**U.S. Cl. 269—21** **7 Claims**

1. A planar vacuum apparatus for holding a workpiece thereon in a selected position comprising

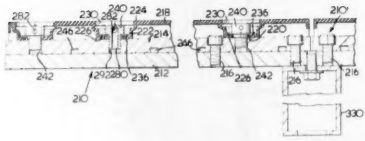
a base surface;

a sheet of resiliently deformable material detachably secured to the base surface having a surface adapted to support said workpiece and being provided with an array of openings therein;

the openings in the sheet each being defined by a bellow-like wall which, collectively, space said deformable sheet above the base surface, said bellow-like walls defining with said openings a plurality of bounded zones;

each bounded zone being connected to a source of subatmosphere pressure;

and a plurality of flow constricting means in the base surface and associated with each opening and bounded zone to limit flow therethrough to a controlled volume;



the volume passed by each opening having an accumulated total volume not exceeding the volumetric capacity of the source.

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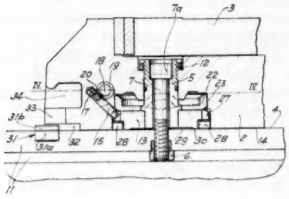
**3,865,360**
**VISE**

**Erich Schweidler, Kempten, Germany, assignor to Saver-Allma GmbH, Allgaver Maschinenbau, Kempten, Germany**

**Filed Oct. 19, 1973, Ser. No. 407,866**
**Claims priority, application Germany, Oct. 25, 1972, 2252269**
**Int. Cl. B23q** *3/06*
**U.S. Cl. 269—100** **8 Claims**



**1.** A machine vise for mounting on a machine table having a plurality of grooves therein each having inwardly extending flanges adjacent the upper edge thereof, comprising:

a base plate having laterally projecting edge rail means;

vise means mounted on said base plate;

a hollow cylindrical bearing collar adapted to support said base plate for rotation with respect to said machine table to a selected angular position, said bearing collar having means defining an external thread thereon;

means defining an externally threaded holding screw received in the interior of said hollow cylindrical bearing collar and being freely accessible from above, and holding screw including holding block means threadedly engaged therewith, said holding block means being received in one of said grooves on said machine table to effect a securement of said bearing collar to said machine table, said holding block means including means for permitting a movement of said holding block means longitudinally of said groove when said holding screw is loosened and for preventing an upward movement out of said groove;

an internally threaded nut threadedly engaged with said external thread on said bearing collar, said nut engaging the upper surface of said base plate so that said base plate will be clamped between said base plate and said machine table; and

clamping means receivable in said grooves and including means for engaging said edge rail means so that said edge rail means of said base plate are clamped between said machine table and said edge rail engaging means.

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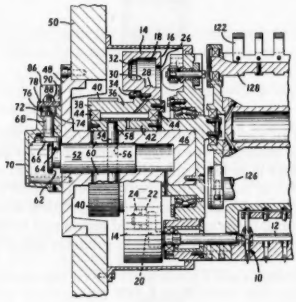
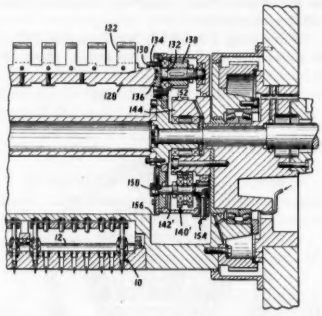
**3,865,361**
**FOLDER CYLINDER**

**Frank Neal, Lititz, Pa., assignor to John C. Motter Printing Press Co., York, Pa.**

**Filed Sept. 11, 1973, Ser. No. 396,248**
**Int. Cl. B65h** *45/16*
**U.S. Cl. 270—76** **17 Claims**



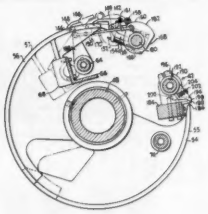


**1.** A rotatable folder cylinder comprising a rotatable shaft, a plurality of pin members coupled to the shaft and responsive to rotation thereof, a cam having at least two camming surfaces thereon, and a cam follower coupled to the shaft to effect the rotation thereof and adapted to travel on each of the camming surfaces, the cam and the shaft being adapted for relative axial movement selectively to transfer the cam follower between the camming surfaces, the two camming surfaces being disposed at discrete axial locations on the cam and being configured to effect operation of the plurality of pin members in the collect mode and in the straight mode, respectively.

## 3,865,362
## SHEET TRANSFER CYLINDER

**Dennis J. Luffy, Butler, and Robert L. Mosemiller, Pittsburgh, both of Pa., assignors to Miller Printing Machinery Co., Pittsburgh, Pa.**

**Filed Feb. 23, 1973, Ser. No. 335,072**
**Int. Cl. B65h *29/06***
**U.S. Cl. 271—82** **7 Claims**



**1.** A sheet transfer cylinder comprising,
a cylinder shaft rotatably journaled in a frame,
a sheet front edge gripper shaft positioned in parallel spaced relation to said cylinder shaft and supported by said cylinder shaft for rotation therewith,
sheet front edge gripper means secured to said sheet front edge gripper shaft and arranged to engage the front edge of a sheet,
means to rotate said sheet front edge gripper shaft to open and close said front edge gripper means at preselected radial angular positions of said cylinder shaft,
a sheet tail edge gripper shaft positioned in parallel spaced relation to said cylinder shaft and said front edge gripper shaft,
means supporting said tail edge gripper shaft for rotation with said cylinder shaft,
sheet supporting means having a cylindrical sheet supporting surface,
tail edge gripper means secured to said tail edge gripper shaft and arranged to engage the tail edge of a sheet positioned on said sheet supporting surface,
means to open and close said tail edge gripper means at preselected radial angular positions of said cylinder shaft including a tail edge gripper means actuator shaft positioned in spaced parallel relation to said tail edge gripper shaft and a cam member rotatably positioned on said tail edge gripper shaft,
lever means connecting said actuator shaft and said cam member,
means to rotate said actuator shaft and said cam member relative to said gripper shaft to thereby open and close said tail edge gripper means, and
means to extend said tail edge gripper means radially outwardly relative to said cylinder shaft beyond the periphery of said sheet supporting surface at preselected angular positions of said cylinder shaft.

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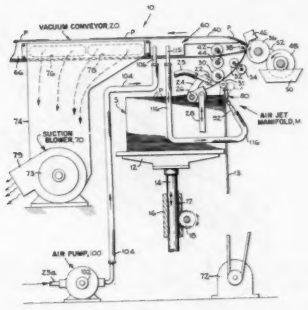
## 3,865,363
**Patent Not Issued For This Number**

## 3,865,364
## ANTI-CURL SHEET FEEDING APPARATUS

**Robert A. Sterner, Oakford, Pa., assignor to FMC Corp., San Jose, Calif.**

**Filed Oct. 4, 1973, Ser. No. 403,698**
**Int. Cl. B65h *3/48***
**U.S. Cl. 271—105** **7 Claims**




**1.** Apparatus for feeding the top sheet of a stack of sheets of paper to a sheet conveyor which conveyor includes a suction chamber having an apertured top, an apertured vacuum belt conveyor running along said top, a suction blower connected to said suction chamber, air pump means at said apparatus, an air line connecting said air pump means to an air jet manifold, said manifold being at the sheet delivery side of said stack and delivering jets of air for riffling the edges of the sheets and means for picking up and feeding the top sheet to said conveyor; the improvement wherein a portion of said air line connecting said air pump means to said manifold is disposed in the stream of air entering said suction blower for cooling the air pumped through the air line substantially down to ambient temperature, for preventing curl and warp of the top sheet of the stack by heat from said manifold air jets.

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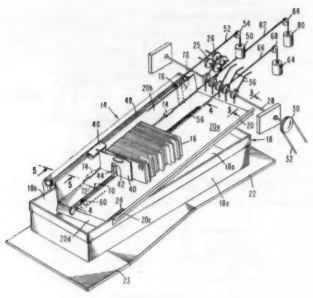
## 3,865,365
## APPARATUS AND METHOD FOR UNLOADING MAIL STACKERS

**William Warner Hardin, Stewartville; David Ernest Peterson, and Delbert Douglas Towne, both of Rochester, all of Minn., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Aug. 17, 1973, Ser. No. 389,294**
**Int. Cl. B65h *31/06***
**U.S. Cl. 271—214** **6 Claims**

**1.** Mail stacking apparatus comprising a stacker trough which has a bottom, a forward end, and an upstanding side and into which envelopes may be moved one at a time and through which the envelopes may move as a stack toward said forward end of the trough as additional envelopes are moved into the trough; a backing member for supporting the forward end of a stack of envelopes as they move toward the forward end of the trough; guiding means carried by said trough side and mounting said backing member so that it may swing upwardly with respect to said trough bottom and so that it may move linearly of said trough side whereby the backing member may move with the forward end of a stack of envelopes in

the trough and whereby the backing member may be swung out of engagement with the forward end of a stack of envelopes and may be moved backwardly to an intermediate place in the stack and may then be moved down into the stack; a second backing member for the forward end of a stack of envelopes which may support the envelope stack in lieu of said first named backing member; guiding means carried by said



trough bottom holding said second backing member in upstanding relationship with respect to said trough bottom and guiding said second backing member in a movement longitudinally of said trough bottom; said two guiding means each extending for a major portion of the length of said trough and being so disposed whereby the longitudinal movement of said two backing members overlaps for a major portion of the length of the trough and said second backing member may move to the forward end of the trough; and means for applying a restraining force on each of said backing members tending to hold said backing members from movement toward said forward trough end whereby said second backing member may be utilized for holding a series of envelopes in said trough in a stack when said first named backing member is swung out of engagement with the forward end of the stack and moved to an intermediate place in the stack.

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**3,865,366**

**VARIABLE MOTION PEDAL ASSEMBLY FOR A FOOT-OWERED VEHICLE**

**Charles T. Stantial, Station Rd., Campbell Hall, N.Y. 10916**

**Filed Jan. 28, 1975, Ser. No. 437,153**

**Int. Cl. A63b** *21/00*

**U.S. Cl. 272—73** **11 Claims**

**11.** In an exercise bicycle, a motion-changing mechanism for connecting a pedal with a crank secured at one end to a rotatable main drive axle of the bicycle, which comprises:

a housing;

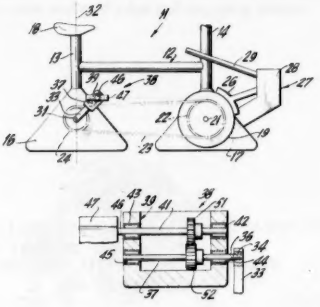
first and second shafts rotatably mounted in the housing in parallel spaced relation and having respective first ends projecting through the housing;

means for securing the opposite end of the crank to the projecting first end of the first shaft;

means for securing the pedal to the projecting first end of the second shaft;

a first externally toothed gear coaxially secured to the first shaft within the housing;

a second externally toothed gear coaxially secured to the second shaft within the housing; and



means disposed in the housing for coupling the first and second gears in driving relation, whereby the pedal is movable in a complex curvilinear path having a prescribed plane of symmetry that is variable by rotating the second shaft about its own axis.

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**3,865,367**

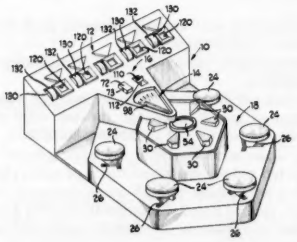
**GAME APPARATUS**

**Jeffrey D. Breslow, Highland Park, and Marvin I. Glass, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Jan. 8, 1973, Ser. No. 321,588**

**Int. Cl. A63f** *9/00*

**U.S. Cl. 273—1 E** **14 Claims**



**9.** For use with question and answer type games or the like, a self-contained game apparatus comprising, in combination: a base structure, means defining a plurality of individually actuatable answer devices mounted on said base structure at least one for each player of the game, means for determining which one of said actuatable answer devices was actuated first by a respective player during a play of the game including a common actuating member selectively engageable by all of said answer devices but only one answer device at a time for actuating purposes, indicating means mounted on said base structure for selective actuation by a questioning player of the game to indicate, for instance, whether the answer of said player first actuating his respective actuatable answer device is correct or not, a timer mounted on said base structure, with means for automatically indicating the end of a given time

period of the timer, said selectively actuatable indicating means and said means for automatically indicating the end of said time period being a common means for rendering an audible signal, and means for selectively stopping said timer at any time during said time period.

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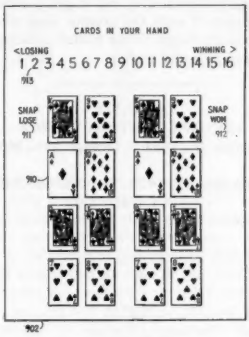
**3,865,368**
**GAMING MACHINES GAMES OF SKILL**
**Robert Francis Needs Grazebrook, Farm Cottage, Colinswood Rd. Farnham Common, Slough, England**
**Filed Feb. 21, 1974, Ser. No. 444,490**
**Int. Cl. A63f *9/00***
**U.S. Cl. 273—1 E** **8 Claims**




1. An amusement machine for simulating the playing of a game of snap, comprising means for simultaneously displaying at least one symbol selected from one series of symbols and at least one symbol selected from a second series of symbols;

means operable by a player to indicate an observed concurrence or relationship between the symbols selected from said respective series of symbols;

means in the machine for indicating when a concurrence has not been indicated before the occurrence of another event.

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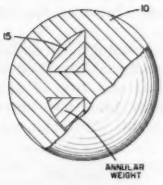
**3,865,369**
**BOWLING BALL**
**John L. Randolph, 1076 N. Jacoby Rd., Akron, Ohio 44321**
**Filed Dec. 20, 1973, Ser. No. 426,506**
**Int. Cl. A63b *37/10***
**U.S. Cl. 273—63 E** **9 Claims**




1. An integral solid bowling ball containing a top weight which more or less offsets the one-sided loss in weight resulting from drilling of finger holes in the neighborhood of an axis passing through the center of the ball and the center of mass of the weight, characterized in that the weight is spaced from the surface with the spacing greater along the axis than in a circumferential location near the midplane, that the weight is closely adjacent to and generally on the top side of the midplane, and that the weight has its mass so distributed that a substantial part of its mass is closer to the surface than to the center of the ball.

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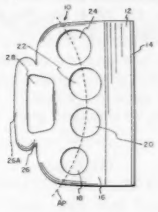
**3,865,370**
**SURVIVAL HAND WEAPON**
**Dale R. Rogers, 2647 Flamingo Dr., Fayetteville, N.C. 28306**
**Filed Dec. 19, 1973, Ser. No. 426,258**
**Int. Cl. B26b *3/00*; B25g *1/00***
**U.S. Cl. 273—84** **1 Claim**




1. A single piece survival hand weapon comprising: a stiff elongated blade portion having a sharp cutting edge beveled along an edge thereof; a finger receiving portion extending from the edge of said elongated blade opposite said cutting edge and having a plurality of side-by-side disposed integral finger openings formed therein including a little finger opening, a ring finger opening, a middle finger opening and a forefinger opening and wherein said ring and middle finger openings are spaced slightly forward of said little and forefinger openings whereby the respective centers of the finger openings lie in a general arcuate path which enables the hand weapon to be confortably held; and a palm rest means extending from said finger receiving portion and being so configured and so sized so as to be engaged by the palm of the user's hand when said hand weapon is hand held for absorbing the shock of a particular blow and transferring the shock to the palm of the user's hand, said palm rest means comprising a single piece member extending from the little and forefinger openings and spaced rearwardly of said ring and middle finger openings so as to form a relatively large opening therebetween; and wherein said blade, finger receiving portion and palm rest means are integrally constructed and co-planar.

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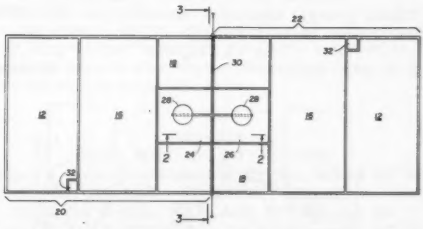
**3,865,371**
**PLAYING FIELD WITH NET AND BASKET STRUCTURE**
**Harry P. Theriot, Rte. 1, Box 1-A, Franklin, La. 70538**
**Filed June 14, 1973, Ser. No. 369,944**
**Int. Cl. A63b *71/02***
**U.S. Cl. 273—95 H** **1 Claim**




1. A game comprising:

an elongated rectangular playing field transversely divided in half, each field half containing at least two adjacent transverse sections, the halves having abutting transverse sections;

a vertical net secured to the field and extending transversely across the middle thereof at the juncture of said halves;

a smaller rectangular area centered on the abutting sections and divided in half by the net; and

first and second horizontal ball receiving baskets, each basket being disposed in a corresponding half of the area at an elevation slightly below the top of the net and above the bottom of the net.

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**3,865,372**

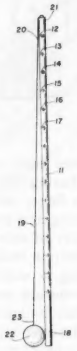
**GRADUATED STICK AND TETHERED BALL**

**Benjamin F. Moore, III, St. Simon Island, Ga., assignor to The Raymond Lee Organization Inc., New York, N.Y.**

**Filed Jan. 18, 1974, Ser. No. 434,496**

**Int. Cl. A63b** *71/02*

**U.S. Cl. 273—95 A** **3 Claims**



**1.** An action toy, comprising

a stick having graduated indications thereon extending along its length and adapted to be manually held substantially vertically at one end;

elastic string-like means affixed at one end to the other end of the stick; and

a rubber ball affixed to the other end of the string-like means in a manner whereby the stick is swingable by a user over his head to move the ball around the stick and wrap the string-like means around the stick.

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**3,865,373**

**MOVING TARGET TROLLEY, MOVING TARGET, AND TARGET RANGE**

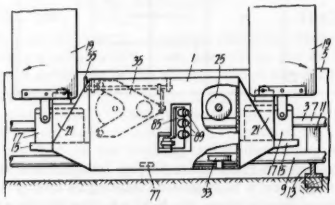
**Lindsay Charles Knight, 677 Lyne, Albury, New South Wales, Australia**

**Filed Jan. 22, 1973, Ser. No. 325,560**

**Claims priority, application Australia, Jan. 25, 1972, 7751/72; Mar. 22, 1972, 8365/72**

**Int. Cl. F41j** *9/00*

**U.S. Cl. 273—105.2** **32 Claims**



**1.** A self propelling trolley for use in shooting ranges wherein the trolley is constructed and arranged to be movable backwards and forwards along a track, means carried by said trolley for propelling the same along said track, a target moving mechanism mounted on said trolley, a target mounted for movement on said target moving mechanism, means for actuating said target moving mechanism for moving said target from an operative shooting position wherein said target is exposed to an inoperative shooting position wherein said target is not exposed, said target being constructed and arranged on said target moving mechanism so that the width of the trolley and target across the direction of intended movement of the trolley when the target is in the inoperative shooting position is not substantially greater than the width of the trolley and target across the direction of intended movement of the trolley when the target is in the operative shooting position, and wherein the position of mounting the target on the trolley is such that when the target is in its inoperative position the height of the trolley and target is substantially the same as the height of only the trolley, and wherein in the operative position the height of the trolley and target is greater than the height of only the trolley.

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**3,865,374**

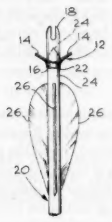
**ARROW LOCATING DEVICE**

**Fernando Troncoso, Jr., 1851 S. Orange Ave., Monterey Park, Calif. 91754**

**Filed Jan. 22, 1974, Ser. No. 435,516**

**Int. Cl. F41b** *5/02*

**U.S. Cl. 273—106.5 R** **7 Claims**



**1.** An improved arrow locating device, said device comprising, in combination:

a. an archery arrow having

i. an elongated tubular shaft;

ii. a plurality of spaced flight vanes disposed adjacent the rear end of said shaft, and,

iii. an arrow nock secured over said rear end; and,

b. a locater comprising a relatively thin, stretchable unitary flexible strip of extended surface area, said strip including a plurality of wings projecting outwardly from a central portion defining an aperture therein, said central portion being uninterrupted except for said aperture, the diameter of said aperature being less than the external diameter of said shaft

said shaft being disposed through said aperture rearward of said vanes, whereby said aperture is stretched, thereby releasably holding said strip in place with said wings sloping rearwardly from said aperture for essentially dragless arrow flight.

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**3,865,375**

**OUTDOOR GAME INCLUDING TUBULAR HOOP STRUCTURE AND PLURALITY OF BALLS**

**Clarence E. Cosgrove, Palatine, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Nov. 29, 1973, Ser. No. 419,919**

**Int. Cl. A63b** *67/00, 63/02*

**U.S. Cl. 273—118 R** **1 Claim**

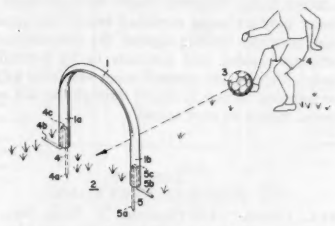
**1.** An outdoor game, comprising

a plurality of hoops supported substantially upright in spaced relation to each other in a desired pattern in the

ground, each of the hoops being a substantially rigid tube;

a plurality of balls each adapted to be kicked along the ground by a corresponding one of the players, each of the balls being a color different from the others; and

a plurality of peg-type members adapted to be partially driven into the ground and to extend from the ground, each hoop being supported by the extending portions of a corresponding pair of the peg-type members, each of



the peg-type members being a wire bent over on itself to a substantially T-shape with a head and with a stem extending at substantially right angles from substantially the center of the head, with substantially half the head adapted to extend into the ground and the other half formed of wire is that portion of the wire containing the bend whereby the bent over on itself adapted to extend from the ground and the stem adapted to rest on the ground, an end of the hoop removably fitting over said other half of the head of the T-shaped member.

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**3,865,376**

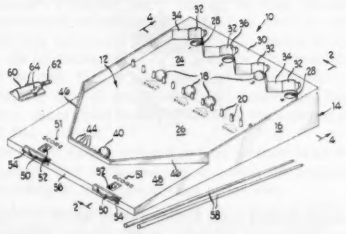
**GAME APPARATUS**

**Marvin I. Glass, Chicago, and Jeffrey D. Breslow, Highland Park, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Sept. 17, 1973, Ser. No. 398,159**

**Int. Cl. A63f** *7/00, 7/10*

**U.S. Cl. 273—125 A** **11 Claims**



**1.** A game apparatus comprising:

a frame;

means defining a playing surface having peripheral confining means substantially thereabout;

a plurality of upstanding spaced pegs disposed on and extending substantially across said playing surface and dividing the playing surface into separate first and second playing areas;

target means disposed in said first playing area;

at least one reboundable playing piece supported for movement over the playing surface in said first playing area for movement toward said target means, said playing piece being of a size and shape so as to be exposed to striking from said second playing area through the spaces between said pegs but not of sufficiently large size to pass through said spaces; and

a cue piece for movement over the playing surface in said second area toward said pegs to strike a reboundable playing piece when disposed at a space between said pegs to propel the reboundable playing piece toward the target means in said first playing area.

**10.** A game apparatus comprising:

a frame;

means defining a playing surface on said frame;

means defining a plurality of target receptacles on said playing surface;

a plurality of playing pieces rollingly supported on the playing surface for movement into said receptacles; and

means for automatically ejecting said playing pieces from said receptacles automatically in response to a predetermined number of said receptacles less than the total number thereof being occupied by playing pieces.

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**3,865,377**

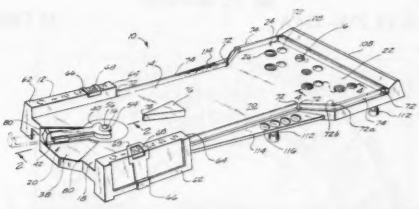
**SHUFFLEBOARD TYPE GAME**

**Julius Cooper, New Hyde Park, and Tormod K. Reinertsen, East Northport, both of N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.**

**Filed Apr. 30, 1973, Ser. No. 355,859**

**Int. Cl. A63b** *67/14*

**U.S. Cl. 273—126 R** **22 Claims**



**1.** A game comprising a relatively flat playing surface having first and second end portions and a plurality of apertures formed in said second end portion, said apertures being arrayed in associated pairs; a plurality of projectiles adapted to move along said playing surface and enter said apertures, and independent scoring means, respectively associated with each of said pairs of apertures, for supporting a projectile in one of the apertures of an associated pair of apertures and for ejecting a projectile supported in said one aperture when another projectile is placed in the other aperture of the pair, said independent scoring means each including an independent lever pivotally mounted below the playing surface adjacent an associated pair of apertures, said lever having first and second end portions respectively associated with the apertures in its associated pair of apertures, and said first end portion of said lever being adapted to displace a projectile supported in its associated aperture when another projectile is placed in the other aperture of its associated pair.

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**3,865,378**

**BOWL FOR TABLE TYPE GAME**

**William B. McPhail, and Hazel M. McPhail, both of 301 Sea Breeze Dr., Port Richey, Fla. 33568**

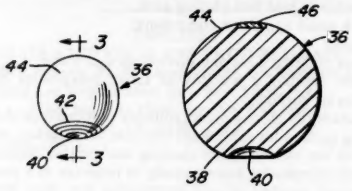
**Division of Ser. No. 75,831, Sept. 28, 1970, Pat. No. 3,741,543. This application Mar. 30, 1973, Ser. No. 347,321**

**Int. Cl. A63b** *71/00*

**U.S. Cl. 273—128 A** **1 Claim**

**1.** For use when playing bowls atop a carpet-covered table provided with target ball in resemblance of a cue-ball, a bowl which is solid and primarily spheroidal but slightly ovoid in shape and appearance and provided on one peripheral surface with a finger seating depression, and a flattened surface ar-

ranged diamterically opposite the depression, said depression being concave, symmetrical about a center point, and of a size and shape to provide a bowl curling seat for the user's thumb or the tip of the index finger and depending on whether the user desires the delivered bowl to swerve and curl leftward or




rightward, said flattened surface cooperating with the depression to provide a rest for the thumb or finger tip in delivering the bowl, said flattened surface being provided with an identification marker disk of a predetermined color embedded therein.

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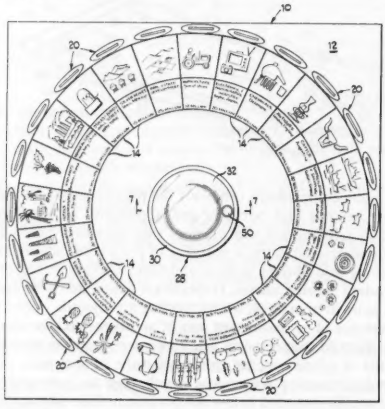
**3,865,379**
**BOARD GAME APPARATUS**
**Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**
**Filed Feb. 16, 1973, Ser. No. 333,210**
**Int. Cl. A63f 3/00**
**U.S. Cl. 273—134 A** **11 Claims**




**11.** In a board game, including a plurality of playing pieces at least one for each player of the game, a game board having a playing surface upon which said playing pieces are supportable, a plurality of stations defined on said playing surface providing a path of travel for said playing pieces at least some of said stations including "investment" stations having indicia representative of at least one investment, a chance device for determining the number of stations a particular playing piece shall advance on the playing surface, and simulated money which may be acquired during the play of the game providing means to acquire a particular investment the object of the game being to acquire the greatest amount of wealth in the form of money or investments, the improvement comprising:
a set of chance cards, each chance card having indicia thereon representative of an advantage one player may exercise over another player or a hazard that a player must suffer, said hazard indicia bearing cards having a signal actuating opening formed therein; and
a housing including
a vertical chamber for receiving a plurality of horizontally stacked chance cards
a slot in the chamber at the same height as the lowermost card through which a card may pass
a card dispenser having a depressible plunger and a horizontally movable card pusher operably connected to the plunger and being in contact with the lowermost card opposite said slot, whereby the lowermost card is pushed out through the slot by the card pusher in response to the depression of said plunger, and
signal producing means including electrical sound means and upper and lower electrical contacts, the upper contact being mounted under the lowermost card, the lower contact being mounted below the upper contact and normally bearing against the lowermost card, said bearing causing said contacts to be normally spaced apart, whereby the contacts meet whenever a card having an opening therein is drawn through the slot causing the sound means to emit sound.

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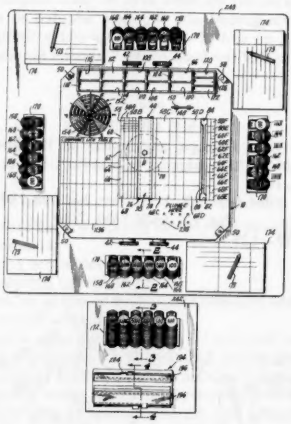
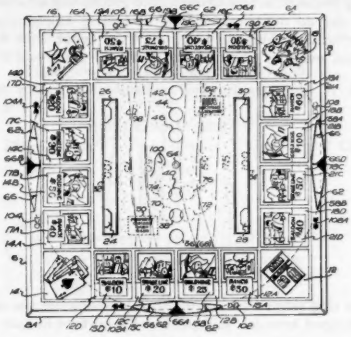
**3,865,380**
**STOCK MARKET GAME**
**Robert L. Thomas, 2190 Olympic Cir., Reno, Nev. 89502**
**Filed Mar. 13, 1973, Ser. No. 340,816**
**Int. Cl. A63f 3/00**
**U.S. Cl. 273—134 AF** **37 Claims**



**1.** A stock market game having a game board provided with a playing surface; a plurality of play-pieces, including tabs having thereon indicia representing different stocks that may constitute the subject of a trade; a ticker tape viewable at the plane of said playing surface bearing current prices of said stocks; a transaction record sheet for each trader having columns thereon headed STOCK, PRICE and OPERATING CAPITAL, respectively, with a column under the latter headed BALANCE and upon which record sheet a trader enters each of his transactions for the purchase and sale of stock and calculates his current operating capital; and wherein stock represented by a given one of said tabs can be traded only based on the monetary value of such current operating capital, with subsequent profits or losses being added or subtracted in said BALANCE column, when liquidation is made, to determine the trader's new balance of operating capital available for the next trade.

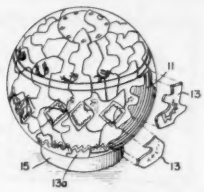
3,865,381
**BOARD GAME APPARATUS**
Geoffrey Hayes, "Thatches," Broadwalk, Prestbury, England
Filed May 1, 1973, Ser. No. 356,101
Int. Cl. A63f *3/00*
U.S. Cl. 273—134 AD 1 Claim



1. A board game apparatus comprising
1. a board having an outer path enclosing a challenge area, the outer path being divided into a plurality of playing positions, the path within each playing position being subdivided into a plurality of "property" areas, the board having a plurality of apertures therethrough in the challenge area,
2. a plurality of playing pieces, each piece having its base configured to fit within the apertures in the challenge area of the board,
3. a disk disposed beneath the board and mounted for rotation relative to the board, the periphery of the disk being exposed at each playing position whereby the disk can be turned in either direction by the player, the periphery of the disk bearing markings for indicating units of rotation of the disk, the disk having a plurality of apertures disposed to come into register with the apertures in the board's challenge area when the disk is rotated sufficiently, the disk bearing starting position indicia situated to be brought into registry with at least one of the apertures in the challenge area, the disk being adapted to support a playing piece having its base situated in an aperture in the challenge area except when an aperture in the disk is brought into substantial registry therewith,
4. a die for determining by chance the direction of rotation of the disk, the die having half of its faces color coded to indicate one direction of disk rotation and having the other faces color coded to indicate the counter direction of disk rotation,
5. the board having colored indicia thereon at each playing position that indicates the direction of rotation corresponding to the color coding of the die,
6. and means for determining by chance the number of units of rotation of the disk to be made by a player.

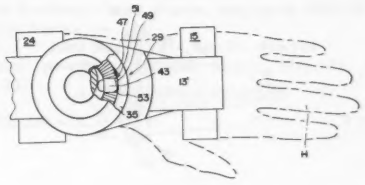
3,865,382
**METHOD OF MAKING A THREE-DIMENSIONAL SHEET PUZZLE**
Rolf Myller, 1165 Fifth Ave., New York, N.Y. 10029
Division of Ser. No. 365,207, May 30, 1973,. This application May 8, 1974, Ser. No. 467,923
Int. Cl. A63f *9/12*
U.S. Cl. 273—157 R 3 Claims

1. A method of making a three-dimensional sheet puzzle comprising providing a three-dimensional form having a surface curved in two dimensions, forming a cover on said surface conforming to the curvature thereof, cutting said cover into pieces sufficiently small so that the pieces can be flattened without appreciable distortion, flattening said pieces, and reproducing the flattened pieces in sheet material which flattens without strain, and depicting on said reproduced



pieces a puzzle design which is comprised when said reproduced pieces are fitted together on said base.

3,865,383
**TRAINING DEVICE FOR GOLFERS**
Cecil W. Clay, and Alvie L. Clay, both of Memphis, Tenn., assignors to Clay & Clay Enterprises, Inc., Memphis, Tenn.
Filed June 5, 1974, Ser. No. 476,700
Int. Cl. A63b *69/36*
U.S. Cl. 273—183 B 16 Claims

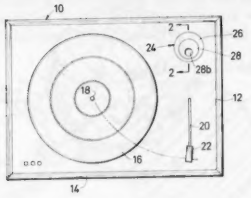


1. A wrist bend restraining device for golfers, said device comprisisng a hand engaging element including means for fixing said hand element to the back of the golfer's hand, a forearm engaging element having a distal portion overlapping a proximal portion of said hand element and including means for fixing said forearm element to the golfer's forearm, and connecting means for pivotally connecting the distal and proximal portions one to the other for pivotal movement of said hand element about an axis disposed substantially perpendicular with the back of the golfer's hand, said connecting means including lock means for normally preventing pivotal movement of said hand element from an intermediate position toward a first position, and release means for releasing said lock means to allow said hand element to pivotally move toward said first position as the golf club head enters the ball impact zone, said release means being actuated at least in part by angular momentum generated during the downswing of the club.

3,865,384
**DISC RECORD PLAYER**
Kohji Yoshida, Shimoarai 1141-29, Tokorozawa, Japan
Filed Mar. 25, 1974, Ser. No. 454,757
Claims priority, application Japan, Mar. 26, 1973, 48-36521
Int. Cl. G11b *3/10*
U.S. Cl. 274—23 R 7 Claims

1. A disc record player having a support shaft supporting a tone arm, comprising a tone arm mounting board and a hole position adjusting mechanism mounted on said tone arm mounting board; said hole position adjusting mechanism including a first disc rotatably and frictionally supported by said mounting board, said first disc having an eccentric hole in

which second disc is mounted, said second disc being provided with an eccentric hole for mounting the support shaft of




the tone arm and said second disc being rotatably and frictionally supported by said first disc.

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**3,865,385**

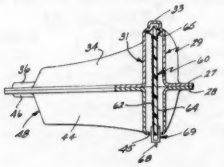
## SOUND REPRODUCTION APPARATUS WITH IMPROVED ACCOUSTICAL TRANSMISSION MEANS

**Stephen A. Platt, Grand Haven, Mich., assignor to Steven A. Platt, Grand Haven, Mich. and Vernon B. Platt, both of Grand Haven, Mich.**

**Filed Sept. 20, 1973, Ser. No. 399,122**

**Int. Cl. G11b** *3/02*

**U.S. Cl. 274—25** **10 Claims**




**1.** In a sound reproduction apparatus for reproducing audio information recorded as perturbations formed in a groove of a disc recordings, improved pick-up means therefor comprising:

a generally planar member formed of expanded polymeric material with integral surface skins on opposite surfaces thereof and having peripheral edge portions;

a pick-up stylus coupled to one of said edge portions of said generally planar member;

support means comprising a pick-up arm adapted to position said generally planar member with said stylus in operative engagement with a recording, said pick-up arm including a recess at one end for receiving a second edge portion of said generally planar member; and

means for bonding said second edge portion of said generally planar member in said pick-up arm recess, opposite said one edge portion to which said pick-up stylus is coupled, and for bonding adjacent portions of said surface skins on opposite sides of said generally planar member to said pick-up arm.

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**3,865,386**

## OIL SEALING DEVICE

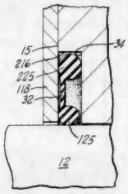
**Raud A. Wilke, Brookfield, Wis., assignor to Koehring Company, Milwaukee, Wis.**

**Filed Apr. 20, 1973, Ser. No. 353,077**

**Int. Cl. F16j** *15/00*

**U.S. Cl. 277—187** **1 Claim**

**1.** In a hydraulic device including a body with a bore that opens to an outer side of the body through a counterbore, a plate secured to said side of the body to partially close the mouth of said counterbore and having an aperture coaxial with the bore, and a cylindrical valve spool slideable axially in the bore with one end projecting through the counterbore and said aperture to the exterior of the body at said side thereof, said aperture being of such diameter that it encircles said spool, the improvement which comprises: a sealing device of resilient material having an inside diameter smaller than the outside diameter of said spool and an outside diameter smaller than the diameter of said counterbore, said sealing device being disposed in said counterbore and having a radially inner ring shaped member movable in sealing engagement at an inner surface with the exterior of the spool, said inner ring shaped member abuttable against said plate and a radially




outer ring shaped seal member which encircles the spool and is clamped between said plate and a surface in said counterbore in radially outward relation to the inner ring shaped member while said inner member is not clamped; said outer seal member being integrally connected by a web which is axially offset in respect to said inner and outer members to the inner member as a fluid tight joint that extends circumferentially entirely around the inner member whereby said inner member can slide axially relative to said spool and against said plate.

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**3,865,387**

## HIGH PRESSURE SEAL

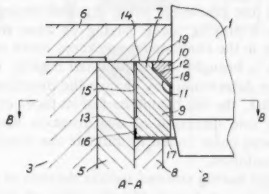
**Hans Larker, and Jan Nilsson, both of Robertsfors, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Apr. 19, 1974, Ser. No. 462,401**

**Claims priority, application Sweden, May 7, 1973, 73063505**

**Int. Cl. F16j** *15/56*

**U.S. Cl. 277—190** **7 Claims**




**1.** In a high pressure press having a seal holder, a high pressure seal to effect sealing between the wall of a high pressure cylinder and an axially movable plunger projecting into the high pressure cylinder, comprising first and second sealing rings of metal, the first ring having an outer surface making contact with the cylindrical wall and an end surface making contact with the seal holder, and the second ring having a cylindrical surface making contact with the plunger and a surface making contact with the seal holder, the first sealing ring which makes contact with the cylindrical wall being prestressed and having a normal diameter which is more than 0.1 per cent greater than the inner diameter of the high pressure cylinder at atmospheric pressure in said high pressure cylinder before prestressing, thereby making contact with the cylindrical wall with a force dependent on the prestressing.

**6.** High pressure seal according to claim **1**, in which the first sealing ring has an inclined surface turned towards the center

line of the ring, and the second sealing ring has an inclined surface turned towards the inclined surface of the first sealing ring with substantially the same angle of inclination.

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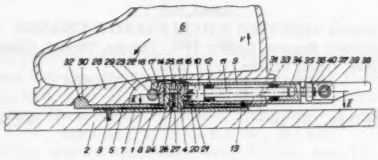
**3,865,388**
**SAFETY BINDING FOR RELEASABLY SECURING A BOOT TO A SKI**

**Gaston Haldemann, Stansstad, Switzerland, assignor to Haldemann S.A., Pilatusstrasse, Switzerland**

**Filed June 12, 1973, Ser. No. 369,350**
**Claims priority, application Switzerland, July 7, 1972, 10261/72**
**Int. Cl. A63c** *9/081*
**U.S. Cl. 280—11.35 D** **7 Claims**



**1.** A safety binding assembly for releasably securing a boot to a ski, comprising:

a. a base plate (**1**) integral with a ski,

b. a vertical axle post (**4**) upstanding from the base plate and having a transverse groove (**15**),

c. a rotating plate (**5**) pivoted about the axle and having front and rear catches (**32, 33**) thereon,

d. a boot (**6**) having two transverse grooves (**30, 31**) in its sole (**28**) adapted to engage the front and rear catches, and a transverse pin (**23**) mounted in a recess (**29**) in the sole,

e. a transverse axle (**16**) partially lodged in the transverse groove of the vertical axle and having a surface (**20**),

f. a lever (**18**) integral with the transverse axle for engaging the transverse pin and urging it toward the rotating plate,

g. a housing (**9**) integral with the rotating plate,

h. a sliding piston (**10**) mounted in the housing and having a front surface (**21**) bearing against the surface of the transverse axle and forming an acute angel ($\alpha$) therewith, and

i. a spring (**12**) mounted in the housing for urging the piston against the transverse axle and the lever against the transverse pin, the transverse pin and the lever being capable of manual disengagement from each other to detach the boot from the ski, and automatic disengagement in the event of an accident.

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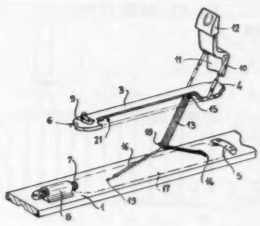
**3,865,389**
**SAFETY BINDING FOR SKIS**

**Marc Delery, Lyon, France, assignor to S.A. Francois Salomon & Fils, Annecy (Haute-Savoie), France**

**Filed Apr. 5, 1973, Ser. No. 348,236**
**Claims priority, application France, Apr. 12, 1972, 72-13502**
**Int. Cl. A63c** *9/08*
**U.S. Cl. 280—11.35 N** **11 Claims**

**1.** A safety binding for a ski comprising: a plate adapted to be mounted between the ski and a skier's boot; first securing elements for detachably securing said plate to said boot; second securing elements for detachably securing said plate to said ski, said second securing elements adapted to yield, beyond a predetermined threshold, to release said plate in response to loads applied in the form of torsion in the plane of the ski and in a verticle plane; at least one flexible connection having one end secured to the ski and the other end secured to said plate; resilient means having one end attached to said flexible connection transversely thereof and at an intermediate point between the ends thereof, said resilient means having a sufficient length to allow said plate to fully separate from said ski and being adapted to apply to said connection a restoring force forming at said intermediate point a fold, said restoring force tending to bring the folded parts of said connection back into a plane parallel to that of said ski.



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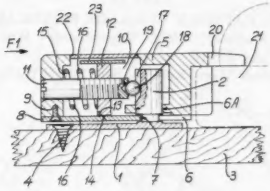
**3,865,390**
**SKI BINDING**

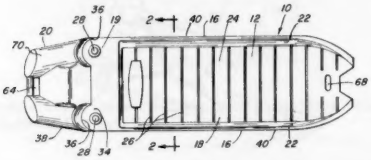
**Michel Pradillon, Cluses, France, assignor to Mitchell S.A., Thyez, France**

**Filed May 2, 1974, Ser. No. 466,504**
**Claims priority, application France, May 11, 1973, 73.17222**
**Int. Cl. A63c** *9/08*
**U.S. Cl. 280—11.35 T** **9 Claims**



**1.** A ski safety binding comprising energy storage means for releasably holding the binding in a closed position, means for adjusting said energy storage means to adjust the force holding the binding in the closed position, and means for displaying the adjustment of said energy storage means, said display means including first and second members movable relative to one another along a given direction, means for moving said members between a plurality of discrete relative positions as a function of the setting of said adjustment means, the first member covering the second member and being provided with a plurality of discrete openings, and the second member having a plurality of discrete marks which are selectively visible through said openings in different relative positions of said members to provide indications representing the settings of said adjustment means, said openings including at least one row of a plurality of like openings aligned along said given direction and said marks including at least one row of a plurality of marks aligned along said given direction with said row of openings, adjacent openings in said row being spaced apart by at least the length of an opening along said given direction multiplied by the number of discrete relative positions of said members each corresponding to an indication.

**3,865,391**
**SLED**
**Dennis M. Melnick, and Mark Kubick, both of Baden, Pa., assignors to Pallet Development Inc., Ambridge, Pa.**
**Filed Dec. 7, 1972, Ser. No. 313,194**
**Int. Cl. B62b** *13/06*
**U.S. Cl. 280—18** **16 Claims**



1. An elongated recreational gravity type sled formed of resinlike material comprising: a surface engaging lower wall; a passenger carrying upper wall overlying said lower wall and spaced therefrom; a peripheral wall extending around the peripheries of said upper and lower wall to support said peripheries; said peripheral wall being integrally formed with said upper and lower walls and being substantially the only support therebetween to form a unitary and substantially hollow sled; said upper wall including at least the major longitudinal extent thereof formed as a generally planar seating surface to receive passengers thereon; and said upper wall additionally includes a plow portion formed with and extending forwardly of said major longitudinal extent of said upper wall, said plow portion including a rear upwardly projecting wall section and a forward plow section which extends forwardly from said wall section and slopes downwardly and inwardly therefrom.

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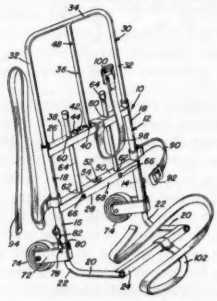
**3,865,392**
**COLLAPSIBLE LUGGAGE HANDCART**
**James W. Hartway, 6805 Boysenberry Way, Colorado Springs, Colo. 80918**
**Filed May 17, 1973, Ser. No. 361,276**
**Int. Cl. B62b** *1/04*
**U.S. Cl. 280—35** **10 Claims**



1. A handcart comprising a generally L-shaped frame including opposite side transversely registered L-shaped side frame members each having generally right angularly disposed tubular short and long legs, first transverse brace means extending between and secured to the free end portions of said short legs and second transverse brace means extending between and secured to the free end portions of said long legs, and a generally U-shaped handle including a pair of parallel legs interconnected at one pair of corresponding ends by means of a bight portion, the free ends of said parallel legs being telescopingly engaged in the free ends of said long legs for extension and retraction of said handle relative to said L-shaped frame, a pair of support arms pivotally secured at corresponding base ends to said long legs adjacent but spaced from said short legs for swinging of said support arms in planes disposed generally normal to said long legs between retracted positions with the free ends of said arms projecting toward each other and extended positions with the free ends of said arms projecting away from the free ends of said short legs, support wheels journaled from the free ends of said arms for rotation about axes transverse to said arms and long legs, said handle and frame including coacting readily releasable latch means for releasably latching said handle in said extended and retracted positions.

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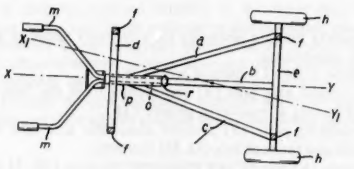
**3,865,393**
**ROAD ADJUSTED WHEELBARROW CHASSIS**
**Rudi Helmut Braune, Griffin Mill, Thrupp, Stroud, Gloucestershire, Great Britain (GL5 2AZ)**
**Filed May 3, 1973, Ser. No. 356,999**
**Int. Cl. B62b** *1/04*
**U.S. Cl. 280—47.26** **6 Claims**



1. A wheelbarrow having a chassis on which a pair of road wheels are mounted for independent rotation about a common axis transverse to the chassis, bearing means rigidly mounted in said chassis and defining a substantially horizontal axis of rotation in a vertical plane of symmetry of said chassis, and a pair of load-bearing and guiding handlebars rigidly connected together and capable of swivelling motion in common about said axis with respect to said chassis so that the left and right handlebars can assume oppositely asymmetrical positions with respect to the chassis when steering to the one and the other side of straight line travel.

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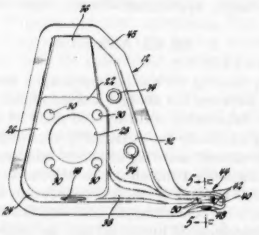
**3,865,394**
**SHEET METAL STEERING KNUCKLE WITH INTEGRAL STEERING ARM**
**Elliot J. Epner, Huron; Oscar G. Kitchin, and Peter M. Sampatacos, both of Port Clinton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.**
**Filed June 11, 1973, Ser. No. 368,708**
**Int. Cl. B62d** *7/18*
**U.S. Cl. 280—96.1** **3 Claims**



1. A steering knuckle having an integral steering arm comprising

a unitary sheet metal, generally cup-shaped member having a bottom wall with a flat portion adapted for mounting a wheel spindle thereon, a stepped portion having a flat shelf spaced from and substantially parallel to said flat portion adapted for mounting a disc brake caliper thereon, and a side wall having a pair of coaxial holes for connecting said steering knuckle to a pair of control arms for pivotal movement about a steer axis,

said side wall further having substantially flat, parallel, closely spaced end portions connected by a bight continuous with said bottom wall forming a steering arm for pivoting the steering knuckle about the steer axis, and

said side wall being continuous and having a continuous outturned flange between said end portions and connected to said bottom wall along substantially the entire periphery of the bottom wall.

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**3,865,395**

## SUSPENSION UNITS FOR MULTIPLE-AXLE VEHICLES

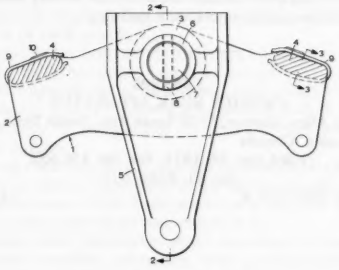
**Robert Valentine Mathers, Chester, and Frederick Thompson, Marford, near Wrexham, both of England, assignors to Rubery Owen-Rockwell Limited, Staffordshire, England**

**Filed Aug. 6, 1973, Ser. No. 385,881**

**Claims priority, application Great Britain, Aug. 12, 1972, 37695/72**

**Int. Cl. B62d** *21/00*

**U.S. Cl. 280—104.5 B** **3 Claims**



1. A suspension unit for multiple-axle vehicles incorporating leaf springs in which the adjacent ends of the springs for adjacent axles are received in opposite ends of an equalizer beam mounted on the frame of the vehicle for angular movement about an axis parallel to the axles, and the equalizer beam incorporates at opposite ends integral bearer pads provided with renewable wearing members for engagement by the springs, wherein said wearing members comprise clips formed of spring steel and adapted to be snapped on to the bearer pads.

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**3,865,396**

## VEHICLE SUSPENSIONS

**Gregory John Bates, Whetstone, England, assignor to Dunlop Limited, London, England**

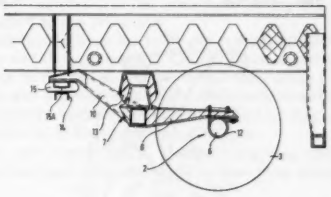
**Filed Sept. 17, 1973, Ser. No. 397,726**

**Claims priority, application Great Britain, Sept. 20, 1972, 43527/72; May 17, 1973, 23483/73**

**Int. Cl. B60g** *11/62*

**U.S. Cl. 280—124 R** **12 Claims**

1. A vehicle suspension for mounting a vehicle body upon a wheel carried in a bearing housing comprising a rigid lever, a main spring and a secondary spring of lower rate than the main spring and having a fixed deflection limit after which the secondary spring becomes effectively solid wherein the main spring, the bearing housing and the secondary spring are attached to the lever at spaced-apart intervals along its length so that wheel suspension movement results primarily in secondary spring deflection until the fixed deflection limit is reached whereupon further wheel suspension movements



pivots the lever about the secondary spring and the main spring provides the suspension and vehicle support.

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**3,865,397**

## VEHICLE SAFETY BELT SYSTEMS

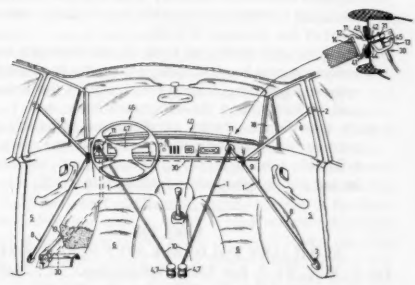
**Stig Tore Lennart Pilhall, Trollhattan; Pehr Harald Benedictus Schalin, Vastra Frolunda; Nils Ivar Bohlin, Askim,all of Sweden, and Rolf Hermann Forsberg, Lillestrom, Norway, assignors to A B Volvo, Goteborg, Sweden**

**Filed Oct. 25, 1972, Ser. No. 300,676**

**Claims priority, application Sweden, Oct. 27, 1971, 13639/71**

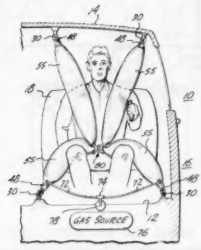
**Int. Cl. B60r** *21/10*

**U.S. Cl. 280—150 SB** **4 Claims**



1. A vehicle having a door and an adjacent seat and at least one self-adjusting sefety belt, means attaching said belt to at least one attachment point on the door adjacent said seat served by said belt, means attaching said belt to a further attachment point on the opposite side of said seat, at least one of said belt attachment means including a latchable belt-collecting device applying a tension force to said belt, means for detachably holding said belt extended away from and in front of said seat, and means connecting said belt-holding means with at least one conventional vehicle component to detach said belt from said belt-holding means in response to activation of said vehicle component to release said belt for collection in said belt-collecting device, said vehicle having a handbrake, said belt-holding means being actuated by movement of the vehicle handbrake from its applied position to its released position, said applied position of said handbrake corresponding to a latching position of said holding means, said released position of said handbrake corresponding to a detached position of said holding means.

**3,865,398**
**EXPANDABLE CRASH-RESTRAINING MEANS**
**Toni Woll, 12912 N.E. 30th, Bellevue, Wash. 98004**
**Filed Feb. 5, 1973, Ser. No. 329,602**
**Int. Cl. B06r** *21/10*
**U.S. Cl. 280—150 AB** **5 Claims**




1. Vehicular occupant-passenger apparatus inflatable by the flow of pressurized gas from a gas source as triggered by sensor means responding to a predetermined rate of deceleration of the vehicle, or to pitch and roll forces applied to such vehicle, comprising:

an end-anchored, occupant-restraining strap-like element at each side of a seat in a vehicle to be disposed in front of the body of an occupant seated in a vehicle;

each said element being anchored at one end to the floor adjacent said seat and at the other end to the overhead above the occupant;

buckle means intermediate the ends of said elements to be engaged in front of the body of an occupant to form said occupant-restraining elements into X-shape relative the front of the occupant's body;

at least one end-anchor of each of said elements including locking means longitudinally adjustable in respect to the vehicle permitting selective variance of the tightness of said elements upon the occupant's body; and

each said element being an elongated inflatable tubular member in communication with said gas source, said inflatable tubular member being normally deflated, collapsed and longitudinally folded upon itself.

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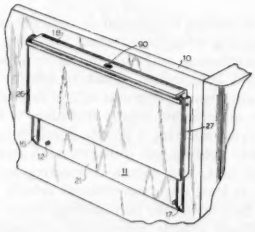
**3,865,399**
**AUXILIARY FOLDABLE STEP STRUCTURE**
**Lee V. Way, Rt. 3, Box 333C, Wilmington, N.C. 28401**
**Filed Oct. 23, 1973, Ser. No. 408,497**
**Int. Cl. B60w** *3/02*
**U.S. Cl. 280—166** **4 Claims**



1. An auxiliary foldable step for a vehicle having a tailgate movable from a vertical traveling position to a horizontal loading position comprising, in combination:

a. a rectangular base plate adapted to be rigidly secured to the outer surface of a tailgate with the respective top and bottom long edges thereof disposed generally parallel, said base plate having secured thereto a pair of stiff arm stops;

b. a rectangular riser plate having its top long edge positioned immediately adjacent and pivotally secured to the top long edge of said base plate for pivoting on a first lengthwise extending axis;

c. a rectangular step plate having its rearward long edge positioned adjacent and pivotally secured to the bottom long edge of said riser plate for pivoting on a second lengthwise extending axis;

d. a first double pair of links, each pair having a common central pivotal connection, one of the links in each pair having a first end pivotal connection to and proximate a respective outer corner of said step plate and the other of the links in each pair having a second end pivotal connection proximate a respective top corner of said base plate for pivoting on said first axis;

e. a second double pair of links, each second pair having a common central pivotal connection, one link of each such second pair having first end pivotal connections to said riser plate and step plate for pivoting on said second axis and the other link of each said second pair having a second end pivotal connection on an end of said base plate and intermediate the width thereof for pivoting on a third axis; and

f. a pair of stiff arms having respective ends secured for pivoting around the respective central pivot connections of each said second pair of links and swingable to a locked position to engage said stops on said base plate and to lock said second and first pairs of links into a fixed operative position to secure said step.

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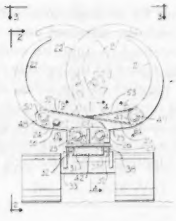
**3,865,400**
**CARRIER BUNK APPARATUS**
**Norman Allen Johnson, 5325 Tenth Ave., South Delta, British Columbia, Canada**
**Filed Jan. 25, 1974, Ser. No. 436,652**
**Int. Cl. B60p** *7/12*
**U.S. Cl. 280—179 R** **14 Claims**

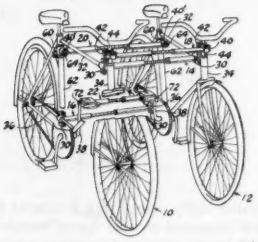


1. A carrier bunk apparatus comprising a pair of jaws each having upper and lower end portions, transverse base means having pivot means at each end, said lower end portions of said pair of jaws crossing in overlapping relation and operatively mounted on said pivot means, cam contour means operatively mounted on one of said lower end portions and cam follower means operatively mounted on the other of said lower end portions, reeving means operatively mounted on each of said pair of jaws intermediate said upper and lower end portions, a flexible tension member operatively entrained in said reeving means, whereby tensioning and loosening of said flexible tension member respectively closes and opens said carrier bunk apparatus.

## 3,865,401
## DUAL BICYCLE COUPLING KIT

Walter D. Kingsly, 806 Lawn Ridge S.E., Huron, S. Dak. 57350

Filed May 16, 1974, Ser. No. 470,693
Int. Cl. B62k *13/06*
U.S. Cl. 280—209 4 Claims



1. Apparatus for coupling two bicycles, each having a frame including a seat tube, pedals and a handlebar stem for simultaneous operation in spaced side-by-side relation, comprising:

at least one rigid longitudinally adjustable frame connector having clamp means at its respective ends adapted to extend between and be connected with a normally horizontal portion of the respective bicycle frame;

a seat tube bracket adapted to be connected with the seat tube of each bicycle,

said seat tube brackets each having a forwardly projecting normally horizontally disposed rod portion;

a rigid longitudinally adjustable seat tube connector having a sleeve bearing transversely connected with its respective ends for surrounding the respective said horizontal rod portion;

steering connector means adapted to interconnect the handlebar stems of said bicycles for simultaneously angular displacement of the front wheels whereby said bicycles are constrained to turn in unison; and,

a longitudinally adjustable pedal connector having a U-shaped member connected with its respective ends adapted to receive a pedal of each said bicycle when the pedals are disposed in aligned opposition for maintaining the angular rotation of the bicycle wheels constant with respect to each other whereby said bicycles are restrained from advancing or receding relative to each other.

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## 3,865,402
## BICYCLE

Darwin Zenser, El Monte, Calif., assignor to Yamaha International Corporation, Buena Park, Calif.

Filed Aug. 13, 1973, Ser. No. 387,669
Int. Cl. B62m *3/00*
U.S. Cl. 280—276 4 Claims

1. A bicycle comprising:

a frame having a tubular primarily vertical front member for receiving a handlebar shaft, a tubular primarily vertical rear member for receiving a seat shaft, an elongated lower member for coupling the front member to the bottom of the rear member, a multiple connection member at the intersection of the lower and rear members, and a pair of elongated shock mount members joined to the vertical rear member and extending rearwardly therefrom;

a pair of wheels with tires along their rims, including a front wheel at the front of the frame and a rear wheel at the rear of the frame;

a pedal assembly rotatably mounted on the multiple connection member;

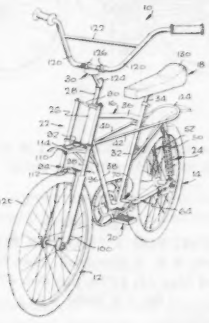
a swing arm having a front end pivotally mounted on the multiple connection member and having a bifurcated rear end with arms on either side of the rear wheel and coupled to the rear wheel;

a pair of rear shock absorbers, each including two telescoping tubes and a spring urging the tubes apart, one tube of each shock absorber having an upper end mounted on a mount member and the other tube having a lower end coupled to the swing arm;

the distance between the pivot axis at the front of the swing arm and the upper end of the rear shock absorbers being equal to the distance between said front swing arm pivot axis and the lower end of the rear shock absorbers;

a handlebar assembly having a shaft extending into the tubular front member to pivot thereon;

upper and lower shock absorber brackets, the upper bracket lying at the top of the tubular front member and



the lower bracket lying at the bottom of the tubular front member, each bracket being fixed to the handlebar assembly to pivot therewith;

a pair of forward shock absorbers, each including two telescoping tubes and a spring urging the tubes apart, one tube of each front shock absorber having an upper end fixed to the two shock absorber brackets to fix the position and orientation of the tube, and the other of each front shock aobsorber coupled to the front wheel; and

a pair of front fender members, including a short lower fender member extending in a loop closely around the tire of the front wheel and fixed to the lower tubes of the front shock absorber, and an upper fender member normally lying at least a few inches above the lower fender member and fixed with respect to the upper tubes, so that the upper fender member moves toward and away from the lower fender member when the front wheel passes over a bump in the road.

2. An assembly for a bicycle that includes front and rear wheels, and that also includes a frame with a front tubular part that extends downwardly and forwardly towards the front wheel to form a steering shaft bearing, comprising:

upper and lower brackets for mounting respectively above and below the front tubular part of the frame;

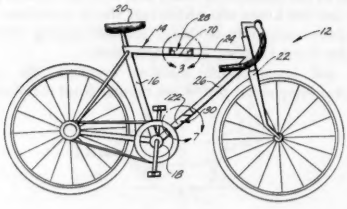
a pair of telescoping shock absorbers each having upper and lower shock members that telescope into one another, each upper shock member attached to both the upper and lower brackets;

a lower fender member connecting together the upper ends of the lower shock members;

an upper fender located between the lower bracket and the lower fender member, and coupled to the lower bracket to move up and down with it, the upper fender located above the top of the lower fender member by a distance greater than the widest tire that can be received between the lower shock members under the lower fender member; and

means at the lower ends of the lower shock members for mounting the lower shock members on the front wheel of the bicycle.

3,865,403
**FOLDABLE BICYCLE AND KIT FOR MAKING SAME**
Gary T. Majerus, Box 85, Sierra Madre, Calif. 91024
Filed June 14, 1973, Ser. No. 369,856
Int. Cl. B62k *3/04*
U.S. Cl. 280—287 13 Claims



12. Apparatus according to claim 11 in which the fasteners are countersunk to avoid protruding parts.

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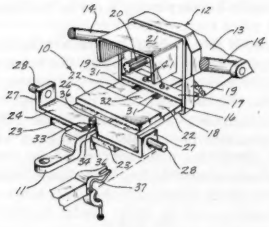
3,865,404
**MOUNTING UNIT FOR A TRACTOR PULLED MOWER**
Dale R. Schwartz, R.R. 2, Hendrick, Iowa 52563
Filed May 17, 1974, Ser. No. 471,001
Int. Cl. B60d *1/14*
U.S. Cl. 280—415 A 4 Claims



1. A mounting unit for a tractor pulled mower wherein the tractor is equipped with a horizontally swingable drawbar and a support therefor that has a rearwardly facing guideway of a rectangular shape defined by a pair of vertically spaced side walls interconnected by end walls and wherein the rear section of the draw bar projects rearwardly from said guideway in resting engagement on the lower one of said side walls, said mounting unit comprising:

a. a frame assembly including a pair of longitudinally extended horizontal side plate members spaced transversely a distance apart to receive said drawbar rear section therebetween;

b. a transverse connecting member secured to the rear upper surfaces of said plate members, said connecting member having upright end walls spaced outwardly from adjacent plate members,

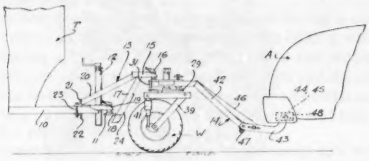
c. a pivot means on each end wall releasably connected with the mower, said pivot means having a common axis extended transversely of said frame assembly,

d. said plate members, when the drawbar is positioned therebetween, having the front end sections thereof receivable within said guideway,

e. means for holding said drawbar against horizontal swinging movement relative to said frame assembly, and

f. means for locking said drawbar against vertical movement relative to said frame assembly.

3,865,405
**TRAILER DOLLY**
Stanley W. Mitchell, 1820 Huron Church Rd., and Edward N. Spenchuk, 1006 Brock St., both of Windsor, Ontario, Canada
Filed Oct. 17, 1973, Ser. No. 407,198
Int. Cl. B60d *1/14*
U.S. Cl. 280—476 R 10 Claims



1. A trailer dolly comprising a central frame member; a towing ball mounted on said frame member for receiving a trailer draft tongue universal coupling; a road engaging wheel assembly swivelly connected via a vertical axis beneath said frame member, said wheel assembly including a bridge member having a pair of spaced longitudinal members supporting thereon a flat plate member having fixed thereto an upwardly extending swivel axle for engaging said frame member, a pair of inclined fork members pivotally connected at their upper ends to a pivotal spacer member joining the forward ends of said spaced longitudinal bridge members, a pair of shock absorbers mounted substantially vertically between the rearward ends of said spaced longitudinal bridge members and the lower ends of said fork members and a road engaging wheel journaled in the lower ends of said fork members; and rigid hitch members extending forwardly and outwardly from said central frame member and having at their forward ends connector means for connecting to the frame of a towing vehicle by means of horizontal pivots.

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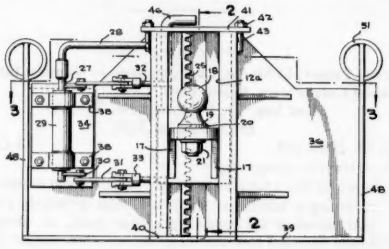
3,865,406
**QUICK CHANGE HITCH FOR TRAILER OR MOBILE HOMES**
Lawrence D. Dutton, Meridian, Miss., assignor to Truck Specialist Inc., Meridian, Miss.
Filed May 31, 1974, Ser. No. 475,256
Int. Cl. B60p *3/06*
U.S. Cl. 280—490 R 10 Claims



1. A trailer hitch comprising a hitch ball assembly including a hitch ball assembled to a guide member having opposite rectilinear vertical guide rail formations and a laterally facing vertically elongated rack gear formation, a channel means defining a vertical guide channel for accommodating vertical sliding movement of said guide rail formations and said rack gear formation including means defining guide grooves for receiving said rail formations, a gear plate in the rail guide channel movable transversely in said channel into and out of engagement with the rack gear formation, and a means for locking the movable gear plate in engagement with the rack

gear formation when the hitch ball assembly has been positioned at the desired height.

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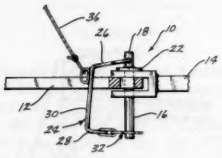
**3,865,407**
**HITCH PIN**
**James G. Klassen, Rt. No. 1, Lindsay, Nebr. 68644**
**Filed Aug. 2, 1973, Ser. No. 385,107**
**Int. Cl. B60d** *1/02*
**U.S. Cl. 280—515** **1 Claim**




1. A hitch pin comprising,
an elongated pin element having a head portion adjacent one end thereof and a transverse bore formed therein adjacent the other end thereof,
a rigid substantially C-shaped actuator element pivotally connected at one end to said pin element adjacent said one end thereof,
a spring retainer clip means pivotally connected to the other end of said C-shaped actuator element and comprising a shank portion adapted to extend through said bore, said clip means also comprising an arcuate portion which yieldably engages said pin element adjacent said bore,
an elongated flexible member connected at one end to said C-shaped actuator element whereby longitudinal movement of said flexible member in one direction will pivotally move said actuator element to cause said clip means to be detached from said pin element,
said actuator element being of said rigid construction to permit said shank portion of said clip means to be inserted into said bore by applying pivotal pressure on said actuator element towards said pin element.

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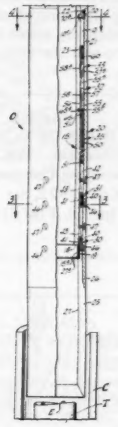
**3,865,408**
**POSITIVE LOCKING SEALING CONNECTOR FOR WELL PIPE**
**Carter R. Young, Lewisville, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**
**Filed Nov. 1, 1972, Ser. No. 302,659**
**Int. Cl. F16l** *35/00*
**U.S. Cl. 285—3** **7 Claims**

1. A sealing connector for well pipes comprising: an elongate tubular housing having means at one end thereof for connection to a first pipe and having a bore for receiving the end of a second pipe movable longitudinally into said bore; an annular sealing assembly disposed in the bore of said housing; a plurality of sets of gripping members in the bore of the housing, at least one set at each of the longitudinally opposite ends of said sealing assembly, the gripping members being disposed to lockingly engage said second pipe when extending through said sealing assembly and gripping members to hold the sealing assembly compressed therebetween in sealing engagement with said second pipe and said housing and to positively lock said housing on said second pipe; a guide sleeve movable longitudinally in the housing with respect to the sealing assembly and gripping members for guiding the end of said second pipe past said gripping members and sealing assembly in the bore of the housing and having thimble means thereon telescoping over the end of said second pipe to cover and guide said end through the locking members and sealing assembly without damaging the same to position the second



pipe within the gripping members and sealing assembly for engagement by the gripping members and sealing assembly.

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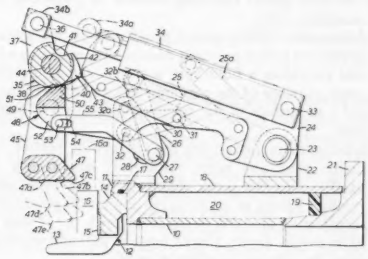
**3,865,409**
**PIPE COUPLINGS**
**Arthur Loftus Paddington, Shinfnal, England, assignor to British Ropes Limited, Doncaster, Yorkshire, England**
**Filed Feb. 20, 1973, Ser. No. 333,737**
**Claims priority, application Great Britain, Mar. 7, 1972, 10507/72; Aug. 24, 1972, 39480/72**
**Int. Cl. F16l** *23/00*
**U.S. Cl. 285—18** **18 Claims**



1. A clamping assembly for a pipe coupling arranged so as to be movable both axially and radially of said pipe coupling for releasably engaging and clamping a flange of a pipe member to said pipe coupling, said clamping assembly including:
a clamping arm;
means mounting said clamping arm for both axial and radial movement with respect to said pipe coupling;
fluid actuated ram means controlling the movement of said clamping arm such that extension and retraction, respectively, of said ram means moves said clamping arm into and out of a clamping position;
locking cam means mounted for movement in response to said movement of said clamping arm so as to mechanically lock said clamping arm when in said clamping position in the event of failure of said fluid actuated ram means; and
means for initially directly transmitting said extension movement of said ram means to said clamping arm, re-

sulting in a relatively large movement of said clamping arm toward said clamping position, and thereafter transmitting continued extension movement of said ram means to said clamping arm through said locking cam means, resulting in a relatively small final movement of said clamping arm into said clamping position and increase of pressure thereto.

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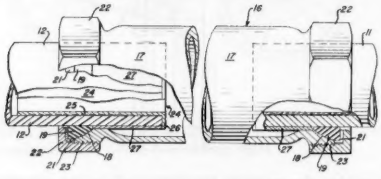
**3,865,410**
**COMPRESSION JOINT OR COUPLING FOR PIPES**
**Keith A. Chen, Milwaukee, Wis., assignor to Norton-McMurray Manufacturing Company, Geneva, Ill.**
**Filed Sept. 29, 1972, Ser. No. 293,340**
**Int. Cl. F16l** *21/00*
**U.S. Cl. 285—31** **12 Claims**



**1.** A compression-type coupling for joining two or more spaced-apart pipes and, lengths of pipe, each having an internal wall surface defined by the inside diameter of said pipe and having an external wall surface defined by the outside diameter of said pipe, at least one of said lengths of pipe being formed of plastic material, said coupling comprising a tubular coupling member having an inner diameter surrounding lengths of pipe positioned within said coupling in telescoping relationship therewith,

each end of said tubular coupling member having gasket sealing means cooperating with reinforcing and sealing attachments on an end of each telescoping pipe, to provide a fluid-tight connection comprising,

an annular gasket engaging surface on each end of said coupling,

a deformable sealing gasket positioned on the telescoping portion of joined pipe and frictionally engageing said pipe and providing a fluid-tight seal between said gasket engaging surface of the coupling and a portion of the external wall surface of the telescoping portion of associated pipe,

a tubular retainer overlying the telescoping portion of associated pipe, and being sufficiently large to be slipped axially over the outer diameter of the pipe, and said retainer having an abutting portion for longitudinal force-transferring abutting engagement with the sealing gasket as an axially directed force tends to pull and separate pipe from the tubular coupling member,

a tubular stiffener partially inserted within an associated pipe to frictionally engage the internal wall surface of the pipe and sandwich the encapsulated pipe between the tubular stiffener and the tubular retainer in a reinforcing relationship increasing the strength of that pipe above that of the plastic pipe alone, said stiffener being provided at one end with an outwardly extending flange having an outer diameter larger than the outer diameter of the operatively associated pipe but smaller than the inner diameter of the associated end of said tubular coupling member, thus permitting the tubular coupling member to be completely and freely slipped over at least one of the reinforced pipes to facilitate joining closely spaced lengths of pipe, and

adjustable means urging said gasket into sealing relationship between said gasket engaging surface of the tubular coupling member and a portion of the external wall surface of associated pipe, said gasket being positioned radially outwardly of a portion of the tubular stiffener and urging the associated underlying pipe into frictional engagement with the tubular stiffener.

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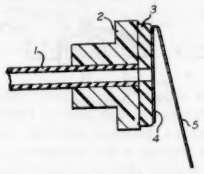
**3,865,411**
**STERILE CONNECTOR FOR CONDUITS**
**Arthur W. Rowe, Stamford, Conn., and Edward T. Marshall, Short Hills, N.J., assignors to Union Carbide Corporation, New York, N.Y.**
**Filed Mar. 29, 1973, Ser No. 346,087**
**Int. Cl. F16l** *17/00*
**U.S. Cl. 285—363** **5 Claims**



**1.** A sterile connector for the end of a conduit which connector comprises a resilient, deformable gasket disposed about the terminal end of a conduit, a continuous, removable, yieldable, flexible strip material, a portion of which is removably adhered to said gasket and overlies the end of said conduit, said strip material having a free end, said strip material being in a generally U-shaped configuration; whereby a force applied to the free end thereof withdraws the entire strip material to expose the end of said conduit.

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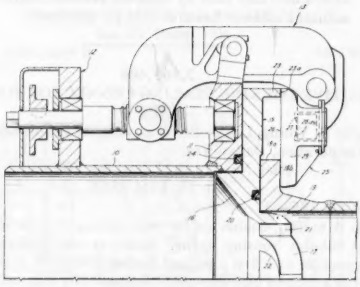
**3,865,412**
**COUPLER**
**Albert A. Ashton, Dallas, Tex., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio**
**Filed Jan. 11, 1973, Ser. No. 322,776**
**Int. Cl. F16l** *19/02*
**U.S. Cl. 285—364** **4 Claims**



**1.** A coupler comprising;

first and second conduits each having flanged ends;

coupler means carried by the first conduit and having a plurality of jaws movable in two directions in a single plane for selectively clamping the first and second conduits together;

a flange adapter positioned between and in engagment with the two conduit flanges;

said adapter having an external flange of greater radial dimension than that of the second conduit flange and spaced therefrom to provide an annular space between the adapter's external flange and the second conduit flange;

said adapter having a flowway for conducting fluids between the two conduits;

means for sealing between the flange adapter and each of the first and second conduits;

jaw adapters carried by the jaws and in engagement with the external flange of the flange adapter and with the flange of the second conduit thereby overlying said annular space;

said jaws engaging and applying force to each jaw adapter at a point between the points of engagement of the jaw adapter with the flange adapter and the second conduit flange.

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**3,865,413**

**PIPE JOINT**

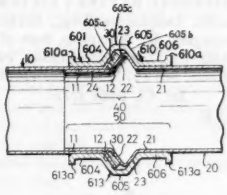
**Shim-Ichiro Mizusawa, Okazaki, and Tsutomu Hishiki, Nagoya, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, Aichi-ken and Sango Co., Ltd., Nagoya-shi, Aichi-ken, both of, Japan**

**Filed June 26, 1973, Ser. No. 373,749**

**Claims priority, application Japan, Sept. 8, 1972, 44-90174**

**Int. Cl. F16l** *17/00*

**U.S. Cl. 285—367** **15 Claims**




1. A pipe joint comprising:

a first tube, a first flange at one end of said first tube,

a second tube, an annular projection on said second tube adjacent one end thereof, one portion of said annular projection being a second flange,

a packing interposed between said first and second flanges, a joint body, said joint body having a coupling portion at each end thereof and a raised projecting portion between said coupling portions, one of said coupling portions abutting and extending over a substantial portion of the annular periphery of a portion of said first tube adjacent said one end thereof, and the other coupling portion abutting and extending over a substantial portion of the annular periphery of a portion of said second tube adjacent said annular projection, said raised projecting portion abutting and extending over a substantial portion of said first flange and the portion of said annular projection other than said second flange, and

clamping means for clamping said joint body to said first and second tubes.

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**3,865,414**

**THUMB PIECE LOCK SPINDLE ACTUATOR**

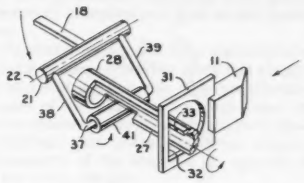
**Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif.**

**Filed Sept. 7, 1973, Ser. No. 395,275**

**Int. Cl. E05c** *1/14*

**U.S. Cl. 292—336.3** **4 Claims**

1. A thumb piece lock spindle actuator comprising a frame, a tubular spindle rotatable about a primary axis relative to said frame, means on said tubular spindle forming an engaging face including an exposed portion of the wall of said tubular spindle extending parallel to and radially spaced from said primary axis, a thumb piece, means for mounting said thumb piece on said frame for rotation about a secondary axis perpendicular to said primary axis, and contact means on said thumb piece




spaced from said secondary axis and adapted directly to abut said engaging face.

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**3,865,415**

**SAFETY SYSTEMS**

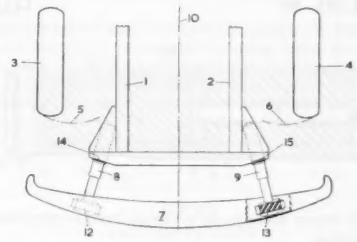
**Karel Saxl, Sutton Coldfield, and George Hall, Birmingham, both of England, assignors to Imperial Metal Industries (KYNOCH) Limited, Warwickshire, England**

**Filed Oct. 26, 1973, Ser. No. 410,093**

**Claims priority, application Great Britain, Nov. 17, 1972, 53185/72**

**Int. Cl. B60r** *19/06*

**U.S. Cl. 293—86** **15 Claims**




1. An energy absorbing system for a motor vehicle having a bumper, the system including two energy absorbing devices interconnecting, in a straight line, spaced attachment points on the vehicle and spaced attachment points on the bumper, the points on the bumper being a greater distance apart than the points on the vehicle so that the devices are angles apart from one another in a direction away from the vehicle, the connections between the vehicle and the devices being rigid, and the connections between the bumper and the devices being such that the bumper ends of the devices can move towards one another in a line transverse to the center line of the vehicle on movement of the bumper towards the vehicle.

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**3,865,416**

**SHOCK ABSORBING BUMPER**

**Joseph L. Burg, 490 Martin Ln., Beverly Hills, Calif. 90210**

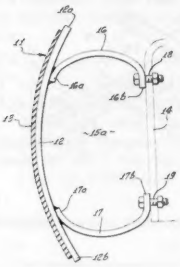
**Continuation of Ser. No. 173,934, Aug. 23, 1971, abandoned. This application June 4, 1973, Ser. No. 366,704**

**Int. Cl. B60r** *19/06*

**U.S. Cl. 293—87** **2 Claims**

2. A bumper assembly for a vehicle including a frame and comprising a bumper having compound curvature and mounted to said frame by horizontally spaced support assemblies each comprising first and second vertically separated, arcuate support members bowed in opposite vertical directions, the front ends of said members being fixedly attached to said bumper inwardly of the respective top and bottom edges thereof, the rear ends of said members being fixedly attached

to said frame, said compound curvature causing said bumper to flatten upon impact, bowed deflection of said members



further absorbing the shock of said impact, the curvature of said bumper conforming to a portion of a spherical surface.

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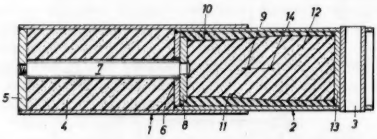
**3,865,417**

**IMPACT ABSORBER FOR BUMPERS**

**Johann Zwickl, Ingolstadt, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany**

**Filed June 12, 1973, Ser. No. 368,433**
**Int. Cl. B60r** *19/06*; **F16f** *3/08*
**U.S. Cl. 293—88** **12 Claims**



1. An impact absorber for a vehicle bumper comprising, in combination:
   a. first energy absorbing means including a first elastomer and having two ends, said first energy absorbing means being arranged in said impact absorber to dissipate energy caused by deformation of said first elastomer upon relative movement of said two ends; and
   b. second energy absorbing means arranged in said impact absorber to dissipate energy caused by friction upon relative movement of said two ends, said second energy absorbing means including:
      1. a pressure plate connected to one of said ends of said first energy absorbing means; and
      2. a friction layer, comprising a second elastomer of greater density than said first elastomer, connected to the other of said ends and arranged to frictionally coact with said pressure plate upon relative movement of said two ends,
   whereby, upon impact, said impact absorber dissipates energy through a combination of deformation and friction.

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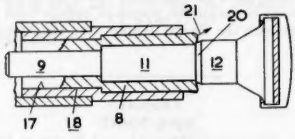
**3,865,418**

**SAFETY DEVICES**

**Karel Saxl, Sutton Coldfield, England, assignor to Imperial Metal Industries (Kynoch) Ltd., Birmingham, Warwickshire, England**

**Filed July 3, 1973, Ser. No. 376,203**
**Int. Cl. B60r** *19/02*
**U.S. Cl. 293—89** **11 Claims**

1. An energy absorbing device for a vehicle, said device including
   a. a container,
   b. an extrudable slug located at least partially within said container,
   c. a ram for back extruding said slug,
   d. a conical head portion of said ram for spreading the extrudate of said extrudable slug, and



   e. a breaker knife edge operatively associated with said ram for splitting said extrudate, whereby movement of said ram relative to said slug results in back extrusion of said slug.

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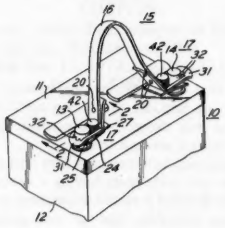
**3,865,419**

**UNIVERSAL BATTERY LIFTER**

**Bernard P. Bowers, Ontelaunee Twp., Berks County, and Delight E. Breidegam, Jr., Kutztown, both of Pa., assignors to East Penn Mfg. Co., Inc., Lyon Station, Pa.**

**Filed Nov. 30, 1973, Ser. No. 420,368**
**Int. Cl. B66c** *1/12*
**U.S. Cl. 294—63 B** **2 Claims**

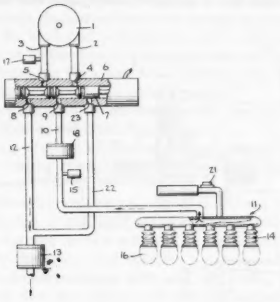


1. A battery lifter comprising
   a strap member having end members for selective battery terminal engagement with upright post terminals or with internally threaded side wall carried terminals,
   said end members including a first jaw member fixedly secured to an end of said strap member and a second jaw member pivotally mounted on said first jaw member for post terminal engagement on opposite sides of a post terminal,
   one of said jaw members having a central opening for post terminal accommodation bounded at one end by terminal post gripping portions for engagement at one side with the post terminal,
   the other of said jaw members having a terminal end portion for engagement at the opposite side of the post terminal and a central portion,
   said other of said jaw members having a screw rotatably carried thereby at said central portion with a threaded shank for internally threaded battery terminal engagement,
   said screw having an enlarged head for manual engagement extending through said central opening for access.

## 3,865,420
## VACUUM CONTROL SYSTEM

William H. Warren, 40 Prospect St., North Brookfield, Mass. 01535

Filed Apr. 12, 1973, Ser. No. 350,325
Int. Cl. B66c 1/02
U.S. Cl. 294—64 R 7 Claims



1. An improved vacuum control system comprising the combination of:
an air pump having an air inlet and an air outlet;
a valve having means for coupling the pump inlet to a first conduit and the pump outlet to a second conduit in a first valve position and for coupling the pump outlet to said first conduit and the pump inlet to a third conduit in the second valve position;
said first conduit being coupled to a vacuum tool outwardly of said valve; and
means at said tool for controlling the operation of the valve between its first and second positions.

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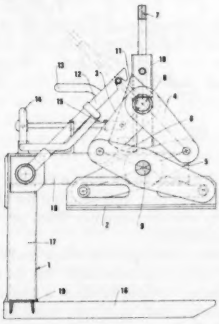
## 3,865,421
## APPARATUS FOR LIFTING AND TRANSPORTING GOODS BY MEANS OF A HOIST

Hermann Pfeifer, Burkhartstrasse 4 - 894, Memmingen/Allgau, Germany

Filed Aug. 3, 1973, Ser. No. 385,556
Claims priority, application Germany, Aug. 4, 1972, 7228907
Int. Cl. B66c 1/22
U.S. Cl. 294—67 AB 3 Claims



1. A lifting clamp for use with a lifting hoist whereby lifting forces cause positive clamping of goods being lifted and transported, comprising:
a frame including a lower portion for engaging beneath goods and an upper support portion above said lower portion;
a scissors linkage assembly including a first pair of levers intermediately on a pivot axis fixed on said upper support portion;
a clamp member overlying said lower portion and including spaced slot portions extending along said clamp member and portions of the first pair of levers whereby pivotal movement of the levers toward each other above the pivot axis causes the clamp member to move downwardly in a rectilinear path toward said lower support portion and movement of the levers in an opposite direction raises the clamp member,
said scissors linkage including a second pair of levers pivotally connected at lower portions to respective upper ends of said first pair of levers,
said second pair of levers being pivotally connected to common pivot shaft mounted on said frame, said frame including guide means operatively connected to said common shaft for retaining the shaft in a rectilinear path of movement relative to the clamp member whereby upward movement of the shaft member causes downward movement of the clamp member and downward movement of the shaft member causes downward upward movement of the clamp member;
a lifting eye member pivoted on said common shaft for movement therewith whereby lifting forces applied to the lifting eye member causes downward movement of the clamp member and downward movement of the eye member causes upward movement of the clamp member; and
releasable latch means on said frame operatively associated with said lifting eye member including means for engaging and retaining the eye member in an inclined position and the common pivot shaft in a downward position while causing the clamp member to be raised whereby during empty transport of the lifting clamp, the lifting clamp is in an "open" condition for immediate engagement with goods.

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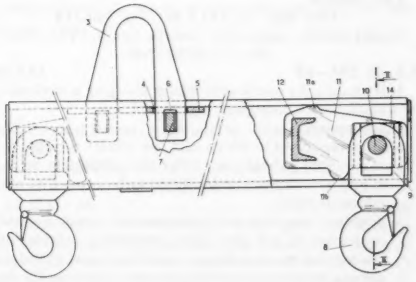
## 3,865,422
## LIFTING DEVICES

Jean-Francois Archer, 10, Ave. Georges-Clemenceau, 78670, Villene-sur-Seine, France

Filed May 8, 1974, Ser. No. 468,295
Claims priority, application France, May 10, 1973, 73.17431
Int. Cl. B66c 1/00
U.S. Cl. 294—81 R 5 Claims



1. In a lifting device
a lifting beam, said beam comprising two sectioned members, each said member having
an upper flange,

a lower flange, and
a web, the two members being arranged with their webs in spaced parallel relation, and
at least two self-locking carriages movable along the beam between the webs of said members, each carriage including
means defining a cavity open to the outside,
shaft means engaged in said cavity, and
lug means bearing against the upper and lower flanges of the members.

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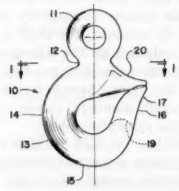
**3,865,423**
**SAFETY HOOK**
**Lloyd D. Ross, 1908 Hood Cir., Carrollton, Tex. 75006**
**Filed Aug. 13, 1973, Ser. No. 388,337**
**Int. Cl. B66c** *1/34*
**U.S. Cl. 294—82 R** **6 Claims**



1. A safety hook for detachably engaging a loop-like lifting member such as a cable loop, shackle, link, or ring, comprising:
a lifting means portion adapted for attachment to lifting means;
an integral depending bight portion, said bight portion comprising:
a bight having a closed side, a bottom, and an open side for receiving a loop-like lifting member into the bight;
the open side of said bight having a pair of upwardly and outwardly diverging legs terminating above the bottom of said bight, and a saddle between said legs;
and a nose portion extending from the closed side of said bight, across and above the bottom thereof to a point between said legs and above said saddle.

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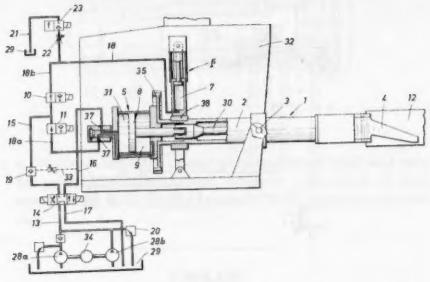
**3,865,424**
**HYDRAULICALLY OPERABLE TONGS FOR CHARGING A WORKPIECE TO BE FORGED**
**Fridolin Jabkowski, Linz, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria**
**Filed Mar. 13, 1973, Ser. No. 340,714**
**Claims priority, application Austria, Apr. 6, 1972, 2946/72**
**Int. Cl. B23q** *3/06*
**U.S. Cl. 294—88** **10 Claims**

1. Hydraulically operable tongs for charging a workpiece to be forged, which comprise
a jaw carrier,
a horizontal pivot to which said jaw carrier is pivoted,
jaws mounted on said jaw carrier and adapted to be closed to grip a workpiece and adapted to be opened to release said workpiece,
a double-acting hydraulic jaw-moving actuator which is connected to said jaws and comprises a cylinder and a jaw-moving piston which is movable in said cylinder and defines therein a jaw-closing pressure chamber for applying pressure to said piston in a jaw-closing sense, and a jaw-opening pressure chamber for applying pressure to said piston in a jaw-opening sense,
controlled pressure-applying means for applying a predetermined pressure to said piston through said jaw-closing pressure chamber,
a hydraulic tilting actuator which is connected to said jaw carrier and comprises a tilting cylinder and a tilting piston which is movable in said tilting cylinder and defines therein a tilting pressure chamber for applying a pressure in excess of said predetermined pressure to said tilting piston so as to control the angular position of said jaw carrier,
a pressure transfer conduit which connects said tilting pressure chamber to said jaw-closing pressure chamber,



shut-off valve means incorporated in said transfer conduit, and
means for applying a pressure which depends on the weight of said workpiece and which exceeds said predetermined pressure through said transfer conduit and said jaw-closing pressure chamber to said jaw-moving piston whereby said jaws grip the workpiece while said shut-off valve means are open.

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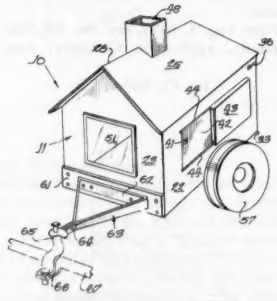
**3,865,425**
**PET TRAILER**
**Marie M. French, 14521 Southwest 65th Ave., Miami, Fla. 33158**
**Filed Dec. 4, 1973, Ser. No. 421,590**
**Int. Cl. B60r** *27/00*
**U.S. Cl. 296—24 C** **1 Claim**



1. A trailer intended to be towed behind vehicles, such as automobiles and the like, and adapted for the transportation of pets in safety and convenience from point to point, comprising in combination:
a body member in the general shape and configuration of a house including a substantially flat rectangular horizontally extending bottom surface, a pair of opposed transversely spaced apart vertically extending side wall members, a vertically extending front end wall member, a vertically extending back end wall member spaced longitudinally from the front end wall member and extending parallel thereto, and a peaked roof member mounted to the top edges of said wall members;

a compartment defined interiorly of the wall members and bottom surface and roof member;
a smooth non-porous waterproof lining member disposed interiorly of the surfaces defining the compartment in juxtaposition with said surfaces;
an opening in the back end wall member of a size and configuration to permit ease of ingress and egress of a pet to the compartment;
a door pivotally mounted on the back end wall along the bottom edge thereof and movable between a first position closing the back end wall opening and a second position defining an inclined ramp extending outwardly and downwardly from the back end wall forming a runway for the pet to gain access to the compartment;
latch means associated with the door for detachably securing the door in the closed position;
a ventilating opening extending through the roof member communicating the compartment with the surrounding atmosphere;
a hollow chimney shaped rectangular member having one end mounted to the roof member about the ventilating opening formed therein with the opposite end projecting upwardly therefrom and defining a passageway therebetween in communication with said ventilating opening to permit air flow into and out of the compartment;
a rectangularly shaped elongated window like opening disposed in one of the side wall members and extending horizontally therethrough between the opposite end edges thereof;
a rectangularly shaped screen forming mesh overlying the side wall opening with the perimeters of the mesh fixedly mounted to the perimeters of the opening to prevent a pet from passing therethrough while permitting free ventilation of the compartment; a pair of vertically spaced apart horizontally extending track members disposed on opposite top and bottom edges of the side wall opening and extending therealong;
a cover member associated with the side wall opening and selectively movable between the limits of a first position fully closing and covering the side wall opening and a second position fully opening the side wall opening;
the cover member being of an elongated rectangular shape of a size greater than the size of the rectangular opening and having opposed horizontally extending side edges and opposed vertically extending end edges, the side edges adapted to be slidingly engaged in the respective track members for axial sliding movement therealong, the cover member selectively adjustable to overlap various areas of the opening to provide a selectable degree of ventilation to the compartment;
a transparent window like member disposed in the front end wall providing visibility of the compartment from exterior of the body member;
a pair of receptacles adapted for containing food and water for a pet with each consisting of an open topped box-like container having a bottom surface and depending surrounding side wall surfaces with each disposed in the compartment, each of the bottom surfaces having at least one aperture extending therethrough;
a plurality of fastening means each extending through an associated aperture and engaging the body member bottom surface to secure the associated receptacle in a fixed position on the bottom surface of the compartment;
a substantially flat divider member adapted to be vertically removably inserted into the compartment extending between the side wall members thereof to separate the compartment into two tandemly disposed chambers, each of the chambers having disposed therein one of the receptacles adapted for containing food and water therein;
a pair of brackets transversely spaced apart and extending downwardly from the body member bottom surface;
an axle assembly mounted to said brackets with the ends of the axle assembly extending transversely outwardly of the planes defined by the respective side wall members;
a pair of wheels with each wheel mounted on opposite ends of the axle assembly to provide a rolling support for the body member;
a first rectangularly shaped member extending transversely of the front end wall adjacent the bottom surface thereof and mounted thereto;
a triangularly shaped member having one leg thereof extending transversely of the first member centrally thereof and fastened thereto, the apex of the triangular member projecting outwardly furthest from the front end wall; and a socket affixed to the apex adapted to be detachably hitched to a towing bracket secured to a towing vehicle, such as an automobile and the like.

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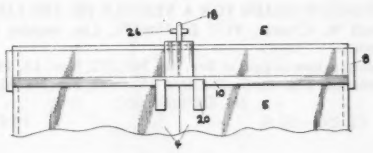
**3,865,426**
## ARRANGEMENT FOR SECURING SWINGING DOORS OF VEHICLES

**Damon Barnhart, Rte. Seven West Hills Two, Frederick, Md. 21701**

**Filed June 18, 1973, Ser. No. 370,752**
**Int. Cl. B62d** *25/00*
**U.S. Cl. 296—50** **3 Claims**




1. In combination with a vehicle having a top and having doors at one end thereof hinged about vertical axes, a bar extending horizontally across the center of the doors, means mounting the bar for swinging movement between a lower position in which it engages on the outside of the doors to hold them closed and a raised position in which it is out of the path of the doors, a part secured to and extending upwardly from the bar and engageable on the top of the vehicle when the bar is in its lowered position, and means engageable with such part for securing it on the top so as to prevent raising of the bar.

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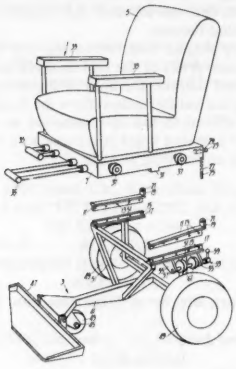
**3,865,427**
## INVALIDS AIDS

**Harold Edward Delany, 9 Millard St., Wangaratta, Victoria, Australia**

**Filed May 16, 1973, Ser. No. 360,976**
**Int. Cl. B60n** *1/10*
**U.S. Cl. 296—68** **12 Claims**

1. An invalid's aid comprising a seat frame, in which an invalid can be supported, and normally fastened to a wheeled carriage by detachable fastening means to form an invalid's chair, a support engaging member on said seat frame detachably engaged with a support carried on the inner surface of the door of an automobile, the arrangement being such that with the automobile door in an open position said seat frame is engageable with the support thereon and upon detachment of the seat frame from the carriage the said frame is secured to the support and upon closing of the door is movable with the

door to be positioned within the automobile, and upon opening of the door is movable partially outside of the vehicle so



that the seat frame and invalid thereon may be carried in the automobile and transferred back to the wheeled carriage.

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**3,865,428**

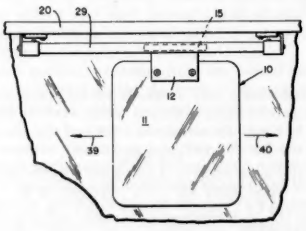
**WINDOW SHADE FOR A VEHICLE OR THE LIKE**

**Carroll W. Chester, 1932 E. 76th Pl., Los Angeles, Calif. 90001**

**Continuation-in-part of Ser. No. 305,872, Nov. 13, 1972, abandoned. This application Dec. 19, 1973, Ser. No. 426,221**

**Int. Cl. B60j** *3/02*

**U.S. Cl. 296—97 G** **10 Claims**



**1.** A shade structure for the window of a vehicle or the like comprising:

a. a first sheet of shade material capable of blocking at least a portion of the light rays impinging thereon, said first sheet having flat opposed major surfaces of smaller area then said window;

b. a second sheet of resilient material, said second resilient sheet having flat opposed major surfaces of smaller area than the area of said major surfaces of said first sheet, a portion of said second sheet overlying a portion of said first sheet and being fixed to said first sheet with one of said major surfaces of said first sheet in contact with one of said major surfaces of said second sheet;

c. means mounting said first and second sheets with the major surfaces thereof adjacent the inside surfaces of said window and generally parallel thereto; said means including a hollow tubular member having an axially extending slot in the wall thereof dimensioned to receive a portion of said second sheet therein with a small tolerance, and a plug member slidably received in said tubular member with a portion of said plug member overlying a portion of said second sheet within said tubular member, said second sheet being fixed to said plug member and said tubular member being fixed at its ends to said vehicle,

said first and second sheets being thin enough to be flexed in a direction transverse of the major surfaces thereof by contact of the human hand at a point on one of the major surfaces of said first sheet and thick enough not to flex in a direction parallel to the major surfaces thereof by forces applied to the edge thereof sufficient to slide said plug within said tubular member.

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**3,865,429**

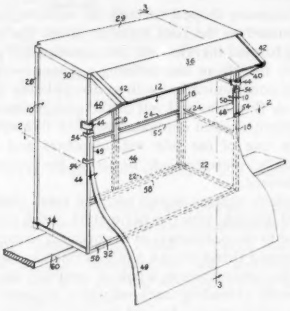
**PORTABLE COLLAPSIBLE SHELTER**

**Joseph K. Barker, Rte. 2, Abingdon, Va. 24210**

**Filed May 18, 1973, Ser. No. 361,540**

**Int. Cl. A47c** *7/66*

**U.S. Cl. 297—184** **10 Claims**



**1.** A temporary portable shelter comprising relatively rigid self-sustaining end walls and a back wall extending therebetween, means movably connecting each end wall to the adjacent end of said back wall, a flexible sheet extending over the tops of and sealed to said end and back walls, a flexible sheet similarly connected to the lower extremities of said end and back walls, and means engaging the top and bottom portions of said end walls and forcing them away from each other to stretch said flexible sheets.

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**3,865,430**

**THEATER CHAIR AUTOMATICALLY MOVABLE BY REMOTE CONTROL**

**Antonio Tanus, Jose T. Cuellar No. 12, Col. Obrera, D.F., Mexico City, Mexico**

**Filed Apr. 24, 1973, Ser. No. 354,065**

**Int. Cl. A47c** *1/12;* **A63j** *5/00;* **A63g** *31/16*

**U.S. Cl. 297—217** **5 Claims**

**1.** A theater chair movable by remote control, comprising a supporting structure, a chassis with a backrest and two armrests integral therewith and installed on the supporting structure, a seat connected to the chassis so as to be rotatable with respect thereto, and vibrational means within said seat, the supporting structure comprising, at each side of the chassis:

a rigid frame;

first bearing means fixed to the frame;

a first pair of threaded spindles supported vertically by said first bearing means;

a first drive motor supported by said rigid frame and connected through first gearing means to rotate said first pair of spindles;

a first pair of sleeves threadedly engaged on said first pair of spindles respectively;

a first plate which connects the first pair of sleeves together;

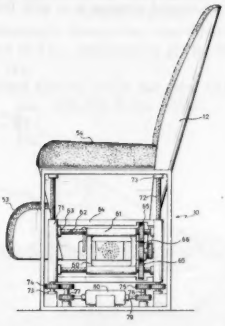
second bearing means fixed to the first plate, a second

pair of threaded spindles supported horizontally by said second bearing means;

a second drive motor carried by said first plate and connected through second gearing means to rotate said second pair of spindles;

a second pair of sleeves threadedly engaged on said second pair of spindles respectively; and

a second plate which connects the second pair of sleeves together,



the second plate at one side of said chassis being connected to said one side of said chassis through at least one ball and socket universal joint and the second plate at the other side of said chassis being connected to said other side of said chassis by way of at least one other ball and socket universal joint so that the two sides of the chassis may be raised or lowered independently of one another by independently actuating the first drive motors and the two sides of the chassis may be moved forwards or backwards independently of one another by independently actuating the second drive motors.

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**3,865,431**

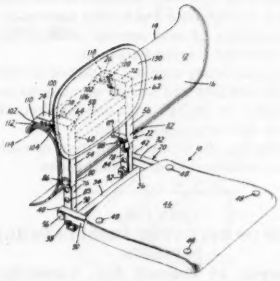
**VEHICLE BUMPER SEAT**

**Victor Zakhi, 124 South Hadley Rd., Fort Wayne, Ind. 46804**

**Filed Oct. 25, 1973, Ser. No. 409,654**

**Int. Cl. A47c** *15/00*

**U.S. Cl. 297—217** **3 Claims**



1. A seat assembly for removable attachment to a portion of a vehicle comprising: a seat frame having forward and rear ends and having a seat panel secured thereto, a supporting frame having lower and upper ends and having a back rest panel secured thereto, first means for connecting said forward end of said seat frame to said supporting frame adjacent said lower end thereof, a pair of hook elements respectively having forward and rear ends, and second means for adjustably connecting said rear ends of said hook elements to said upper end of said supporting frame with said hook elements extending forwardly from said supporting frame and being selectively adjustable with respect thereto between extended and retracted positions, said distal ends of said hook elements having hook portions thereon adapted to engage said vehicle portion thereby to support said assembly thereon with said supporting frame depending from said hook elements and said seat frame extending rearwardly from said supporting frame, said seat frame comprising a pair of spaced, paralled members having forward and rear ends and a lateral member connecting said parallel members and spaced from said forward ends thereof, said first connecting means pivotally connecting said forward ends of said parallel members to points on said supporting frame spaced from said lower end thereof thereby permitting upward pivotal movement of said seat frame and seat panel between lower and storage positions, said lateral member engaging said lower end of said supporting frame in said lower position thereby limiting downward pivotal movement of said seat frame and supporting the same in said lower position thereof.

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**3,865,432**

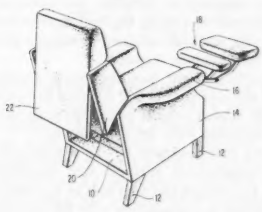
**RECLINING CHAIR**

**Walter Clark Rogers, Jr., High Point, and Morton Snitzer, Greensboro, both of N.C., assignors to Royal Development Company, Inc., High Point, N.C.**

**Filed May 29, 1973, Ser. No. 364,462**

**Int. Cl. A47b** *1/02;* **A47c** *1/02*

**U.S. Cl. 297—316** **15 Claims**



1. In a reclining chair having a stationary frame, a seat mounted on the frame for movement relative to the frame between normal and reclining positions, and a backrest pivotally connected to the seat to be movable with the seat between normal and reclining positions and to be movable relative to the seat between a partially reclined position and a fully reclined position; linkage means for supporting said seat and backrest for movement relative to the frame between said normal and reclining positions thereof, the linkage means including a balance link extending below said seat, first pivot means pivotally mounting said balance link intermediate its ends to said frame for permitting said balance link to move relative to said frame, a front mounting link pivotally interconnecting front portions of said balance link and said seat, a second, rear mounting link pivotally interconnecting the backrest and a rear end portion of said balance link, said first pivot means being located intermediate the connections of said front and rear mounting links to said balance link, and restraining means preventing pivoting movement of said balance link relative to said frame when the chair moves from a normal to said partially reclined position but permitting pivotal movement of said balance link about said first pivot means relative to said frame under actuation by said rear mounting link when the backrest is moved to a further reclined position beyond said partially reclined position, said linkage means including a third, rear mounting link pivotally connected to said backrest and pivotally connected to said frame forwardly of said second rear mounting link, the pivotal connection between said third mounting link and said backrest acting as a fulcrum for said back rest when moving beyond said partially reclined position to a further reclined position, said first pivot means

being located forwardly of the pivotal connection of the third mounting link to the frame.

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**3,865,433**

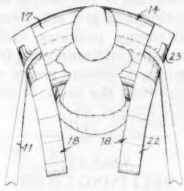
**ENERGY ABSORBING RESTRAINT FOR PASSENGERS**

**David F. Stafford, 3504 N. Dale, Spokane, Wash. 99206**

**Continuation-in-part of Ser. No. 122,946, March 10, 1971, abandoned. This application Apr. 4, 1973, Ser. No. 347,774**

**Int. Cl. B60r** *21/02*

**U.S. Cl. 297—390** **10 Claims**



1. A vehicle occupant restraint for restraining movement of a vehicle occupant seated on a vehicle seat assembly having a substantially horizontal seat and an upright seat back in conjunction with a flexible seat belt extending forward along both sides of the seated occupant and transversely across in front of the occupant, comprising:

side panels adapted to straddle the occupant, said side panels adapted to rest on the horizontal vehicle seat with exterior side surfaces adapted to engage the seat belt as the seat belt extends forward;

a substantially straight bending beam section extending between the side panels and adapted to extend across the lap of the seated vehicle occupant with the ends of the beam connected with the side panels;

said bending beam section having a forward substantially straight longitudinal surface, said longitudinal surface adapted to support the seat belt in normally rectangular configuration in conjunction with the surfaces of the side panels;

said bending beam member having a rear surface adapted to oppose the occupant and adapted to be forcibly contacted by the occupant during sudden forward deceleration of the vehicle associated with a vehicle crash;

said bending beam section being formed entirely of self-supporting material free of internal or external rigid reinforcement elements and being of sufficient tensile strength to enable the bending beam section to progressively significantly bend outwardly into an arcuate displacement configuration between the side panels and against the seat belt, placing the forward surface of said beam in longitudinal tension and the rear surface of said beam in longitudinal compression and thereby progressively absorbing the kinetic energy of the occupant as the bending beam is being deflectively bent into the arcuate configuration without forcibly rebounding the occupant against the upright back seat.

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**3,865,434**

**ROTATING WHEELCHAIR ARM**

**Fenton F. Sully, Encino, Calif., assignor to Everest & Jennings, Inc., Los Angeles, Calif.**

**Filed July 20, 1973, Ser. No. 381,512**

**Int. Cl. A47c** *7/54*

**U.S. Cl. 297—417** **7 Claims**

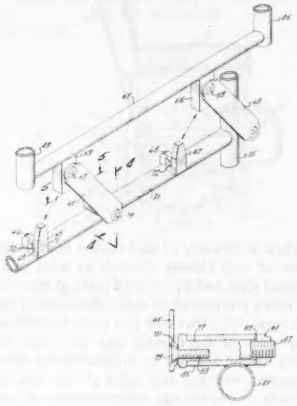
1. A wheelchair, comprising:

a wheelchair frame;

an armrest, said armrest including a first interconnecting anchor member, said first interconnecting member being a hollow square tuube depending from and rigidly attached to said armrest;

a pair of links, each pivotally mounted at one end to said frame and at the opposite end to said armrest to provide arcuate movement of said armrest relative said frame between a first and a second position; and

a second interconnecting member, said second interconnecting member comprising an upstanding dog which is rectangular in cross section and rigidly attached to said wheelchair frame, said second interconnecting member having a trapezoidal upper extremity, said first and second interconnecting members positioned to engage with one another when said armrest is in said first position.



2. A wheelchair, comprising:

a wheelchair frame;

an armrest, said armrest including a first interconnecting anchor member;

a pair of links, each pivotally mounted at one end to said frame and at the opposite end to said armrest to provide arcuate movement of said armrest relative said frame between a first and a second position;

a second interconnecting member, attached to said wheelchair frame, said first and second interconnecting members positioned to engage with one another when said armrest is in said first position; and

means for adjusting the center of rotation of each of said pair of links relative said wheelchair frame.

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**3,865,435**

**STIMULATION OF RECOVERY FROM UNDERGROUND DEPOSITS**

**Sarvajit S. Sareen, 24 Concord Ave., Cambridge, Mass. 02138; Lucien Girard, III, Prescott Rd., Boxboro, Mass. 01719, and Robert A. Hard, Still River, Mass. 01467**

**Filed Dec. 6, 1973, Ser. No. 422,233**

**Int. Cl. E21c** *41/06*

**U.S. Cl. 299—5** **5 Claims**

1. In a hydrometallurgical operation for the in-situ underground mining of a low grade copper-containing formation by the use of a copper leaching solution for extracting copper values from said formation, the improvement which comprises the step of prior to contacting said copper-containing formation with said leaching solution, the formation is contacted with an aqueous hydrogen peroxide solution containing a

stabilizing agent therefor and whereby said agent reacts with the copper-containing formation to form a precipitate and the resultant substantially unstabilized hydrogen peroxide decomposes to form a gaseous medium which causes additional fracturing of the formation whereby greater leaching efficiency and copper loading is achieved with the subsequent copper leaching step.

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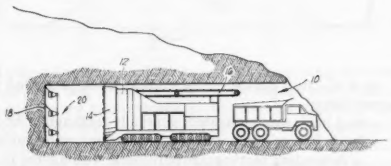
### 3,865,436
### METHOD OF BORING THROUGH HARD ROCK FORMATIONS

**Vernon R. Dorrough, Grapevine, and Claude H. Brown, Arlington, both of Tex., assignors to Jet Research Center, Inc., Arlington, Tex.**

**Filed Dec. 6, 1973, Ser. No. 422,445**
**Int. Cl. E21c** *37/00*
**U.S. Cl. 299—13** **11 Claims**



**1.** A method of excavating rock comprising the steps of:
a. placing at least two shaped charges on the face of the rock to be excavated so that the spacing between the center lines of said charges is greater than the diameter of said charges by a factor greater than 7 and so that upon detonation the energy from said charges is directed inwardly from the face of said rock whereby a portion of said rock is softened but not substantially fragmented;
b. detonating said charges; and
c. mechanically removing the portion of said rock softened by the detonation of said charges.

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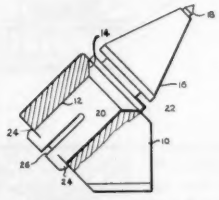
### 3,865,437
### ROTARY MINING TOOL RETAINING STRUCTURE

**Melvin A. Crosby, Latrobe, Pa., assignor to Kennametal Inc., Latrobe, Pa.**

**Filed Aug. 16, 1973, Ser. No. 388,725**
**Int. Cl. E21c** *35/18*
**U.S. Cl. 299—86** **11 Claims**



**1.** An excavating tool comprising coaxial forward and rearward portions and adapted for assembly with a support member, said forward portion tapering inwardly to a point at the front end and said rearward portion being substantially circular in cross section at each axial point therealong and adapted for being closely but freely rotatably received in a bore in the support member with the forward portion of the tool protruding axially from the forward end of the bore and with the rearward portion of the tool protruding at the rearward end from the rear end of the bore, an element of abutment means on said tool adapted for engagement with an element of abutment means on the support member to sustain working thrusts imposed on said tool in the rearward direction, said rearward portion of the tool comprising at least one radially resilient region integral therewith near the rearward end of said rearward portion, and at least one projection on the radially outer side of said radially resilient region protruding radially therefrom and adapted for engagement with the support member rearwardly of the rear end of the bore in the support member for releasably and freely rotatably retaining the tool in assembled relation with the support member, said tool being drivable into and out of the bore in the axial direction.

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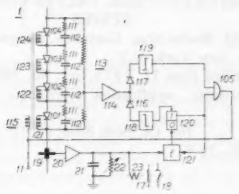
### 3,865,438
### PROTECTION MEANS AGAINST AUTO-IGNITION FOR THE RECTIFIERS OF A STATIC CONVERTER

**Carl Ingvar Boksjo, and Karl Erik Olsson, both of Ludvika, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Feb. 2, 1970, Ser. No. 7,843**
**Claims priority, application Sweden, Feb. 14, 1969, 2025/69**
**Int. Cl. H02m** *1/18*
**U.S. Cl. 321—13** **5 Claims**



**1.** Static converter having thyristor-rectifiers, each rectifier of the converter being provided with a protection means against auto-ignition comprising a means sensing the polarity of the voltage over the rectifier, an And-gate, said sensing means including means to emit a first signal to said And-gate when the voltage after a commutation becomes negative and a second signal when the voltage after a commutation becomes positive, means connecting the And-gate to the ignition system of said rectifier to supply both signals thereto, the connecting means for the first signal including a delay device which delays the signal a certain predetermined time corresponding to the longest recovery time for said thyristors of the rectifier so that if the second signal is emitted during this time an ignition signal is allowed to pass the And-gate.

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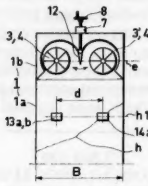
### 3,865,439
### APPARATUS FOR DEPOSITING FIBER FLOCK IN A CHUTE

**Robert Moser, Winterthur, and Paul Staheli, Wilen near Wil, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Filed Dec. 29, 1972, Ser. No. 319,869**
**Claims priority, application Switzerland, Jan. 4, 1972, 61/72**
**Int. Cl. B65g** *53/40*
**U.S. Cl. 302—59** **15 Claims**

**1.** Apparatus for separating opened fiber flocks from a fiber-flock-laden transporting air stream into a stationary depositing chute connected to a stationary pneumatic transporting duct, said chute having an entrance at one end and means for draining air therefrom below said entrance and retaining a fiber flock column therein characterized in having an adjustable deflecting means for deflecting the fiber-flock-laden transporting air stream in a direction across the width of said chute, said deflecting means being located between a portion of said chute connected to said duct and a flock deposit position in said chute, and at least two sensing means in said chute for sensing the height of a flock column in said chute, said sensing means being disposed at the same height

relative to said chute and in spaced relation to each other, each said sensing means being connected to said deflecting




means to individually activate said deflecting means in response to the detection of a portion of the flock column at said height.

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**3,865,440**

**A HYDRAULIC BRAKING SYSTEM WITH A PLURALITY OF BOOSTER CONTROL VALVES CONNECTED IN SERIES**

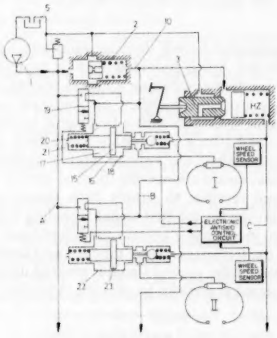
**Fritz Ostwald, Buchschlag, Germany, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed June 11, 1973, Ser. No. 369,019**

**Claims priority, application Germany, July 28, 1972, 2237030**

**Int. Cl. B60t** *8/06, 13/12*

**U.S. Cl. 303—21 F** **9 Claims**




**1.** a hydraulic boosting system comprising:

a hydraulic pump having an input and an output;

a hydraulic medium reservoir having an input and an output directly connected to said input of said pump;

*n* hydraulic boosting control valves each having an input and an output, said output of one of said control valves being directly connected to said input of an adjacent one of said control valves to connect said control valves in series with each other, where *n* is an integer including one, said output of a last of said control valves being directly connected to said input of said reservoir to place said reservoir in series with said control valves and said input of said pump;

a by-pass flow governor having an input directly connected to said output of said pump and a control-valve-side output directly connected to said input of a first of said control valves to place said pump and said governor in series with said control valves and said reservoir; and

at least one hydraulic control device for an antiskid system directly connected to said input and said output of said governor to place said control device in parallel with said governor.

**3,865,441**

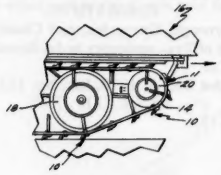
**PENETRATING STUD FOR SNOWMOBILES**

**James D. Jolliffe, 2411 Maple Valley, Grand Rapids, Mich. 49508**

**Filed Sept. 28, 1973, Ser. No. 401,867**

**Int. Cl. B62d** *55/24*

**U.S. Cl. 305—54** **14 Claims**




**6.** A traction device for an endless track-propelled vehicle comprising:

a stud having an elongated, generally rectangular body, said body having a generally flat planar mounting surface and a depending rectangular peripheral wall having rear, side and front portions, the rear portion of said wall being downwardly and rearwardly inclined, and having a pair of spaced downwardly projecting, surface-penetrating spurs, said rear portion of said wall extending substantially below said forward portion thereof.

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**3,865,442**

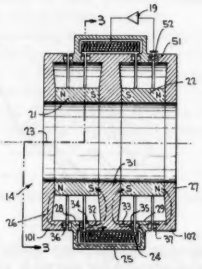
**MAGNETIC BEARING**

**Philip A. Studer, Silver Spring, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Dec. 22, 1970, Ser. No. 100,637**

**Int. Cl. F16c** *39/06*

**U.S. Cl. 308—10** **24 Claims**




**1.** A magnetic bearing comprising a low reluctance magnetic circuit having first and second air gaps in a magnetic series path, first magnet means coupled to said circuit for producing oppositely directed magnetic fluxes in the air gaps, and second magnet means coupled to said circuit via a low reluctance path excluding the first magnet means for producing similarly directed magnetic fluxes in the air gaps.

## 3,865,443
## RESILIENT SIDE BEARINGS

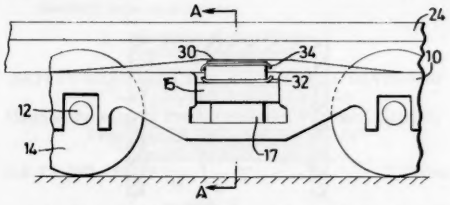
Raymond Frederick James, Bradford-on-Avon, England, assignor to Avon Rubber Co., Limited, Melksham, Wiltshire, England

Continuation-in-part of Ser. No. 198,237, Nov. 12, 1972, abandoned. This application Sept. 4, 1973, Ser. No. 394,272

Claims priority, application Great Britain, Nov. 13, 1970, 54124/70; Canada, Nov. 12, 1971, 127475

Int. Cl. B61f *5/14*; F16c *17/04*; F16f *13/02*

U.S. Cl. 308—138 8 Claims




1. A railway vehicle resilient bearer for positioning between a vehicle body and a bogie to frictionally engage one of them, the bearer having two opposed plates, and a resiliently compressible thick-walled, open-ended hollow tube of elastomeric material between the plates with its axis parallel to the plates, respective ones of the two said plates being secured against repsective ones of opposite faces of the tube to extend generally parallel to each other, whereby upon the plates moving towards each other the tube is compressed in its radial direction against the resilience of the elastomeric material of the tube, and restraint upon the plates moving parallel to each other is provided by the elastomeric material of the tube.

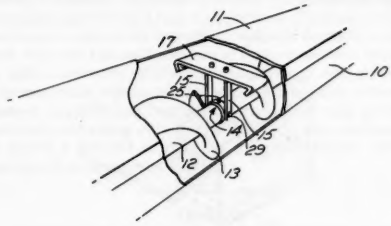
## 3,865,444
## SCREW CONVEYOR HANGER BEARING

Gilbert V. Lavoie, 311 Elm St., Raynham, Mass. 02767

Filed June 27, 1973, Ser. No. 373,976

Int. Cl. F16c *1/24*

U.S. Cl. 308—187.1 3 Claims




1. In an internally mounted screw conveyor shaft hanger bearing assembly, the combination with a tubular screw conveyor shaft of a coupling shaft means, said coupling shaft means having a stepped section of two diameters, an antifriction bearing received about the lesser of the two diameters, a hanger housing extending about the bearing and forming an outer race therefor, said housing having an extension portion slidingly received on the greater of the diameter of said shaft coupling means, said housing extension having a reduced annular portion, the tubular conveyor screw shaft slidingly received about the reduced annular portion, means securing together said tubular shaft and said coupling shaft for rotation and means affixed to the central portion of the housing to support the housing in position, whereby a labyrinth is formed from the bearing to the outside of the conveyor shaft.

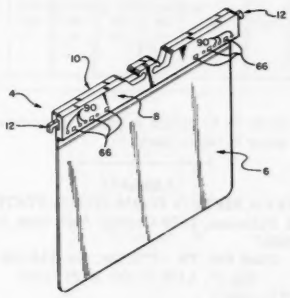
## 3,865,445
## HANGING BINDER

Carl J. Dean, Southbridge, and David M. Wright, Shrewsbury, both of Mass., assignors to Barry Wright Corp., Watertown, Mass.

Filed Feb. 26, 1973, Ser. No. 335,718

Int. Cl. A47b *63/00*

U.S. Cl. 312—184 1 Claim




1. A rail mountable filing device comprising an elongate suspension unit formed of two elongate mutually-confronting members, one of said elongate members comprising a plurality of integral studs and the other of said elongate members comprising a plurality of cavities, said studs being disposed in said cavities and secured to said other elongate member whereby said elongate members are joined to one another, at least one of said elongate members having along its upper side and intermediate its ends at least one mounting means for mounting said device to at least one supporting rail, and a pair of suspension elements mounted to said suspension unit at the opposite ends thereof, each of said suspension elements having a hooked end portion, said suspension elements being disposed in channels defined at least in part by one of said elongate members, said suspension elements being slidable in said channels between (1) a first extended position in which said hooked ends extend beyond the ends of said elongate members in position to interlock said device to and between a pair of spaced supports, and (2) a second retracted position in which said hooked ends are retracted substantially fully within said pair of spaced supports, and detent means for releasably locking said suspension elements in either of said first and second positions, said detent means comprising a pair of spaced first and second openings in one of said elongage members adjacent each end thereof, a resilient detent section formed integral with each of said suspension elements, and a projection on each detent section, said detent sections being disposed so that said projections will enter and provide a detent action with said first and second openings when said suspension elements are moved to said first and second positions respectively.

## 3,865,446
## STORAGE MEANS WITH SHIFTABLE UNITS

Pasquale Patrick John Mastronardi, Northfield, N.J., assignor to Estey Corp., Red Bank, N.J.

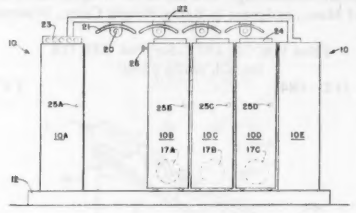
Filed Dec. 4, 1972, Ser. No. 311,660

Int. Cl. B60m *1/34*; A47b *53/00*

U.S. Cl. 312—201 8 Claims

1. In a shiftable storage means including a plurality of movable stacks, supporting means for each of said stacks, including a reversible electric motor and two relay means for each of said stacks for controlling the direction of the motors and stacks, and a plurality of safety switches secured to the sides of each movable stack for cutting off the current to the motors when the stacks move too close to each other; the improvement which comprises: a normally open pair of relay contacts

mounted on one of said relay means for completing a bypass circuit around a safety switch on an adjacent stack for permitting both stacks to be moved in unison in a desired direction to open a space between stacks.



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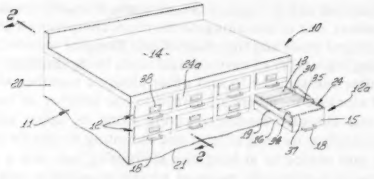
**3,865,447**

**PRESCRIPTION FORM FILING SYSTEM**

**Richard J. Patterson, 2170 Century Park East, Los Angeles, Calif. 90067**

**Filed Feb. 20, 1973, Ser. No. 334,139**
**Int. Cl. A47b** *81/00*; **B42f** *21/00*
**U.S. Cl. 312—234.2** **1 Claim**



**1.** In prescription form filing, and data entry equipment, the combination comprising

a. a cabinet including a pull-out drawer carried for longitudinally forwardly outward movement relative to the cabinet to expose multiple prescription forms filed in the drawer, the drawer having a front vertical panel,

b. a writing shelf carried by the drawer to have a generally horizontal position in which the entirety of the shelf overlies the upper front interior portion of the drawer, the shelf upper side receiving a prescription form having multiple prescription entry zones and multiple auxiliary zones,

c. hinge means on the drawer supporting the shelf for swinging movement through above 270° between extended horizontal writing position as defined, and retracted vertical position in which the reverse side of the shelf is forwardly exposed at the front side of the drawer front panel and the lower edge of the shelf is above the level of the drawer underside, the entirety of the shelf in said retracted position extending closely adjacent and parallel to said drawer front panel,

d. a grid carried by the shelf upper side for movement in overlying relation to the prescription form received on the shelf, the grid having cutaways corresponding to said zones characterized in that said grid movement sequentially exposes, for viewing, corresponding pairs of said zones, each pair including one prescription entry zone and one of said auxiliary zones, the grid cancealed between the shelf and drawer front panel when the shelf is retracted, said cutaway to successively overlie and expose said prescription entry zones, and multiple laterally and longitudinally offset cut-aways arranged to successively overlie and expose said auxiliary zones adapted to receive entry of prescription price data, in response to advancement of the grid relative to the prescription,

e. guide means on the shelf for guiding grid forward and rearward movement relative to the shelf and for retaining the prescription form thereon,

f. and a label carrier on said reverse side of the shelf.

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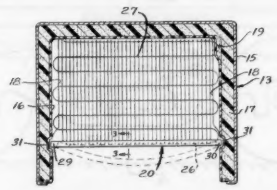
**3,865,448**

**SHELF RETAINER**

**Sylvester A. Winterheimer, Evansville, Ind., assignor to Whirlpool Corp., Benton Harbor, Mich.**

**Filed Oct. 9, 1973, Ser. No. 404,191**
**Int. Cl. F25d** *11/00*; **A47h** *1/14*
**U.S. Cl. 312—311** **12 Claims**



**1.** In a refrigerator having an outer cabinet, a shelf having side edges and a front edge, a liner within said cabinet including side walls having support means for supporting the side edges of the shelf within said liner, and retainer means for retaining said shelf on said support means, said retainer means comprising: means on said liner defining first retaining means adjacent said front edge of said shelf; and a deformable member embracing the front edge of said shelf, said deformable member having an upper portion overlying said front edge of the shelf, and opposite ends defining second retaining means cooperating with said first retaining means to prevent movement of said shelf front edge upwardly and forwardly from said support means.

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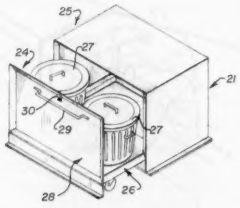
**3,865,449**

**GARBAGE ENCLOSURE**

**Sadler C. McCaslin, and Wilbur J. Smith, both of Phoenix, Ariz.**

**Filed Mar. 2, 1972, Ser. No. 231,098**
**Int. Cl. A47b** *97/00*
**U.S. Cl. 312—352** **1 Claim**



**1.** A garbage enclosure comprising:

*a.* A generally box-like enclosure having an opening in one wall thereof and being otherwise closed;

*b.* A movable cart including:

1. A generally horizontal base member constructed and arranged for carrying at least one garbage container; and

2. A generally vertical rear member constructed and arranged to close said opening when said movable cart is moved into said generally box-like enclosure.

*c.* Said garbage enclosure including a locking device constructed and arranged to maintain said rear vertical member in said opening;

*d.* Said generally box-like enclosure including a first bug barrier adjacent its bottom, said first bug barrier compris-

ing an angle attachment extending from about a 45° angle to about a 60° angle downward from the horizontal;

*e.* Said movable cart including a second bug barrier around the circumference from said generally horizontal base member, said second bug barrier comprising an angle attachment extending from about a 45° angle to about a 60° angle downward from the horizontal;

*f.* Said movable cart including wheels; and

*g.* The border of said generally vertical rear member and the border of said opening being constructed and arranged to provide a seal when said generally vertical rear member is moved into said opening, said borders comprising matched angle attachments.

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**3,865,450**

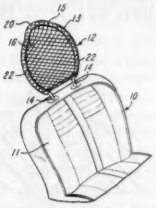
## SAFETY HEAD REST FOR AUTOMOBILE SEATS AND THE LIKE

**Matthias Bruenig, 23 Parchimerstrasse, Hamburg, Germany**

**Filed Apr. 19, 1973, Ser. No. 352,547**

**Int. Cl. A47c** *1/10, 7/12*

**U.S. Cl. 297—397** **7 Claims**




**1.** An improved safety head rest unit for an automobile seat, comprising a substantially rigid frame having a pair of spaced leg portions each terminating with a lower portion adapted to be attached to the upper portion of the automobile seat, a net member mounted on said frame and including a front wall portion and a rear wall portion positioned in parallel spaced relation by said leg portions of said frame, at least said front wall portion and said rear wall portion of said net member being formed of a relatively coarse flexible netting material having sufficiently large openings to provide for a clear view through said wall portions, said leg portions of said frame having substantial thickness to provide for substantial spacing between said front and rear wall portions of said net member, and means operatively associated with said frame to maintain said front and rear wall portions of said net member in tension to effect rearward deforming of said front wall portion in response to an impact by a person's head until said front wall portion engages said rear wall portion and then combined rearward deforming of both said front and rear wall portions to assure a gradual increase in the resistance to rearward movement of the person's head.

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**3,865,451**

## SUSPENSION DEVICE FOR WORKPIECES TO BE TREATED IN AN ELECTRICAL GLOW DISCHARGE

**Horst Rordorf, Weiningen, Switzerland, assignor to Elektro-physikalische Anstalt Bernhard Berhaus, Vaduz, Liechtenstein**

**Filed Aug. 8, 1973, Ser. No. 386,507**

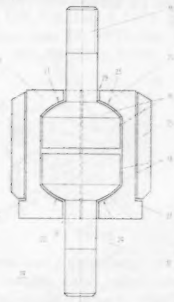
**Claims priority, application Switzerland, Aug. 25, 1972, 12594/72**

**Int. Cl. H01r** *39/64*

**U.S. Cl. 339—8 R** **3 Claims**

**1.** In a glow discharge device including a metal discharge container, a power source and an insulated current lead-in from one pole of said source into said container, a suspension device arranged within said container adapted to suspend workpieces to be treated by the glow discharge, the suspension device comprising:

an upper and a lower bolt disposed vertically in substantial axial alignment, the upper end of the upper bolt being conductively connected to said current lead-in, the lower end of the upper bolt having an enlarged head of which the upper portion is shaped with a convex surface; the upper end of said lower bolt being formed with an enlarged head adjacent but below said head of the upper bolt and having the lower portion shaped with a convex surface, the lower end of said lower bolt having means thereon for supporting workpieces;



a metallic housing electrically connecting said both bolts, said housing enclosing both said heads and providing play between the housing walls and the heads and between the heads, axially opposite ends of the housing having openings for the shafts of said bolts, the inner housing surfaces surrounding said openings being concave and providing surfaces slidably engaging said convex surface portions of said heads, so that the lower bolt carrying said workpieces is pendulous relative to the upper bolt and capable of swinging into a vertical position.

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**3,865,452**

## SPARK GAP PROTECTION IN CATHODE RAY TUBE SOCKETS

**Robert B. Pittman, River Edge, N.J., assignor to Industrial Electronic Hardware Corp., New York, N.Y.**

**Filed Aug. 1, 1973, Ser. No. 384,701**

**Int. Cl. H01r** *3/06*

**U.S. Cl. 339—14 T** **23 Claims**

**1.** A tube socket for use with a tube having a first pin normally operating in a first potential range and a second pin normally operating in a second potential range, said socket comprising a support, first and second terminals mounted on said support and adapted to conductively receive said first and second pins respectively, first and second grounding means on said support, said first mounting means being spaced from said first terminal to form a gap therebetween and said second grounding means being spaced from said second terminal to form a gap therebetween, means for independently electrically connecting each of said grounding means to ground,

whereby a spark can independently bridge said gap between the respective means and the terminal associated therewith without affecting the order terminal.

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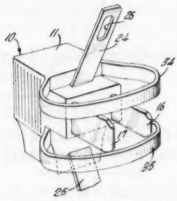
**3,865,453**

## SAFETY ADAPTER FOR THREE-WIRE GROUNDING PLUG

**Juan M. Lopez, New York, N.Y., assignor to Leviton Manufacturing Co., Inc., Little Neck, N.Y.**

**Filed Oct. 5, 1973, Ser. No. 403,914**
**Int. Cl. H01r** *3/06, 13/50*
**U.S. Cl. 339—14 R** **4 Claims**



**1.** In an adapter for converting a two-wire parallel outlet to a three-wire ground outlet, said adapter having a body of insulating material with two parallel contact blades extending from a lower face thereof and spaced female contacts including a grounding contact on an upper face thereof, the improvement which comprises:

a. a pair of ground straps connected to a ground contact in an adapter body;

b. said ground straps having outer ends extending beyond the adapter body adjacent a lower face thereof and on opposite sides thereof;

c. each of said ground straps having an outer end containing an opening for receiving a grounding screw; and

d. collapsible guard means extending downwardly from the adapter body on opposite sides of parallel male blades of the adapter and positioned for engagement with an opposing face of a receptacle prior to engagement of said male blades with female contacts of a receptacle;

e. said guard means comprising members collapsible to a flattened condition upon entry of the male blades into said female contacts.

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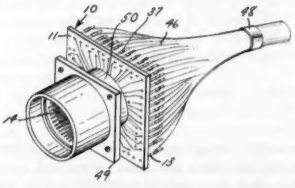
**3,865,454**

## ADAPTER FOR HIGH DENSITY CONNECTORS

**Marvin Blinder, Union, N.J., assignor to Loral Corp., New York, N.Y.**

**Filed July 18, 1973, Ser. No. 380,506**
**Int. Cl. H05k** *1/04*
**U.S. Cl. 339—17 C** **3 Claims**



**1.** Means for interconnecting high density circuitry comprising in combination: a high density connector including a housing having pin contact retention means defining a plurality of closely spaced socket openings disposed in mutually parallel relation within said housing, and an adapter comprising a printed circuit board element having first and second planar surfaces, and having a generally centrally disposed area of size and configuration corresponding to said pattern of closely spaced openings in said connector, said area having a corresponding plurality of openings therethrough, a plurality of elongated pin contacts, each having one end thereof fixed within one of said plurality of openings, and extending outwardly substantially perpendicular to one of said planar surfaces; said circuit board element having a second generally peripherally disposed area having a second corresponding plurality of openings, and a plurality of lug connectors, each having one end fixed within said second plurality of openings; and a plurality of printed circuits, each interconnecting one pin contact with a corresponding lug connector to establish electrical communication therewith, said pin contacts being engaged within said high density connector, and a plurality of conductors attached to said lug connectors.

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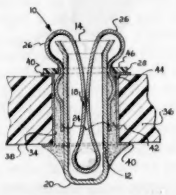
**3,865,455**

## CIRCUIT BOARD SOCKET

**Quentin Berg, deceased, late of Cumberland County, Pa. (by Frances H. Berg, executrix), and New Cumberland, Pa., assignors to E. I. Dupont de Nemours & Co., Wilmington, Del.**

**Filed Dec. 6, 1973, Ser. No. 422,436**
**Int. Cl. H01r** *9/12, 11/00;* **H05k** *1/02*
**U.S. Cl. 339—17 C** **8 Claims**



**6.** A contact system comprising a support having a socket-receiving hole formed therein, a socket inserted in the hole in the support including an elongate hollow body having an open end located outwardly of the support, contact means within the body for forming an electrical connection with a lead inserted into the body through the open end, the exterior surface of the body located within the hole being spaced from the hole to form a solder flow path, solder in said path forming an electrical connection between the body and contact means on the support, and a collar closely fitted around the end of the body projecting from the hole and engaging the support so that the collar closes the solder flow path between the body and the hole.

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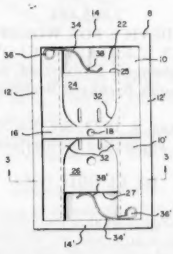
**3,865,456**

## COVER PLATE FOR ELECTRICAL OUTLET

**Frank Peter Dola, Port Richey, Fla., assignor to AMP Inc., Harrisburg, Pa.**

**Filed Aug. 2, 1973, Ser. No. 385,121**
**Int. Cl. H01r** *13/54*
**U.S. Cl. 339—40** **3 Claims**



**3.** Cover plate means for a dual electrical receptacle unit, said unit having first and second electrical receptacles, each of said receptacles having two plug blade openings and having

a grounding pin opening, said plug blade openings and grounding pin opening being adapted to receive the blades and the grounding pin respectively of an electrical plug, said blade openings and pin opening of each of said receptacles forming an isosoles triangle, and the two receptacles of the unit being located with the pin opening of the first receptacle adjacent to the blade openings of the other receptacle, said cover plate means comprising:

a flat plate member having first and second windows therein and having an integral bar extending between said windows,

first and second shutters in said plate member, said shutters being slidable towards and away from each other, spring means biasing said shutters towards and against said bar, said first shutter having two shutter blade openings therein which are spaced from said bar, said shutter blade openings in said first shutter comprising a pair of parallel slots which extend

parallel to the direction of sliding movement of said first shutter whereby,

upon moving said first shutter away from said bar, said shutter blade openings of said first shutter are brought into alignment with said blade openings of said first receptacle and said first shutter moves beyond said pin opening of said first receptacle thereby to permit insertion of a plug into said first receptacle,

said second shutter having a pair of blade openings therein which are immediately adjacent to said bar and having a pin opening therein which is relatively remote from said bar, said blade openings in said second shutter comprising a pair of parallel slots which extend parallel to the direction of sliding movement of said shutter and which extend to the edge of said shutter which is against said integral bar whereby,

upon moving said second shutter away from said bar, said blade openings of said second shutter are brought into alignment with said blade opening of said second receptacle and said pin opening is brought into alignment with said pin opening of said second receptacle thereby to permit insertion of a plug into said second receptacles.

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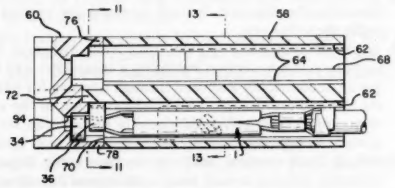
**3,865,457**

## LOW INSERTION FORCE RECEPTACLE AND CAMMED HOUSING

**Clyde Thomas Carter, Shermansdale, Pa., assignor to AMP Inc., Harrisburg, Pa.**

**Filed June 4, 1973, Ser. No. 367,072**
**Int. Cl. H01r** *13/62*
**U.S. Cl. 339—74 R** **7 Claims**




1. A zero insertion force connector having at least one gripping electrical terminal mounted within a housing of dielectrical material, the improvement comprising: said housing having a cover portion provided with an aperture corresponding to said terminal position in said housing, said terminal having a pair of contact fingers projecting into the aperture of said cover, said cover being mounted on said housing for translation to a first position biasing said terminal fingers to open positions defining a receptacle throat area adjacent said aperture of said cover, said cover portion being biased to a second position allowing said terminal fingers to deflect resiliently toward each other into closed positions narrowing said receptacle throat area, said fingers having channel configurations which are in alignment with each other to define said receptacle throat area and which are biased past each other to define said narrowed throat area.

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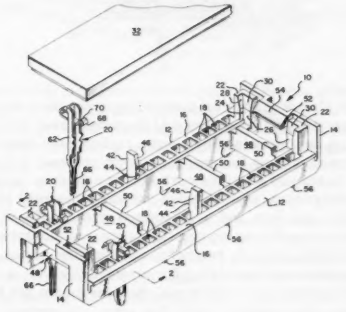
**3,865,458**

## CIRCUIT PANEL CONNECTOR

**William Vito Pauza, and Edward Michael Poltonavage, both of Palmyra, Pa., assignors to AMP Inc., Harrisburg, Pa.**

**Division of Ser. No. 158,778, July 1, 1971, Pat. No. 3,754,203.**
**This application June 20, 1973, Ser. No. 371,806**
**Int. Cl. H01r** *13/54*
**U.S. Cl. 339—91 R** **4 Claims**




3. An electrical connector for connecting external circuitry to terminal pads located on one face of a thin rectangular substrate, said terminal pads being arranged in two parallel rows which extend along marginal opposed side portions of said substrate, said connector comprising:

an open rectangular housing frame having parallel spaced-apart side rails and end rails extending between, and connecting, the ends of said side rails, said side rails being spaced apart by a distance which is substantially equal to, and slightly greater than, the width of said substrate as measured between said side pads,

a plurality of electrical contact terminals mounted in, and extending through, said side rails, said terminals being spaced apart in each of said side rails by distances corresponding to the spacing between said terminal pads, said terminals having first end portions extending beyond one face of said frame, said first end portions defining a substrate receiving zone,

each of said terminals having on said first end portion a resilient cantilever arm extending inwardly of said frame and into said substrate receiving zone for engagement with one of said terminal pads,

each of said terminals having connecting means extending beyond the other face thereof for forming electrical connections with said external circuitry,

substrate holding means on said end rails for engagement with end portions of said substrate to hold said substrate in said zone with said terminal pads in engagement with said cantilever arms, and

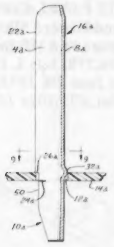
locating means on said side rails for locating said substrate in said substrate receiving zone with said pads in contact with said cantilever arms, said locating means being engageable with edges portions of said substrate whereby,

upon placement of said substrate in said zone and engagement of said holding means with said substrate, said terminal pads will be connected to said contact terminals and to said external circuitry by means of said connecting means.

## 3,865,459
## ELECTRICAL TERMINAL

Terence L. Mills, Hook End near Brentwood, England, assignor to Molex Inc., Lisle, Ill.

Filed Aug. 8, 1973, Ser. No. 385,404
Int. Cl. H01r 9/06
U.S. Cl. 339—95 R 10 Claims



1. An electrical terminal comprising a one-piece elongated sheet metal body that defines a U-shaped channel with spaced apart legs that are joined by a bight, said channel-body having an entrance portion for insertion into an aperture in a printed circuit board and a trailing portion for connection to an electrical component, said entrance portion comprising shoulder means on said legs, and a slit formed in each of said legs at locations spaced from the corresponding shoulder means, said slit extending generally parallel to said shoulder means, the leg sections below said slit being flared outwardly with respect to the leg sections upon which said shoulder means are formed, to define edge portions, such that upon engagement of said entrance portion in said aperture, said leg sections will yield during passage through said aperture, but will snap into locking position upon passage therethrough, with said edge portions engaging one surface of said printed circuit board while said shoulder means is engaged with the other, opposed surface of said board.

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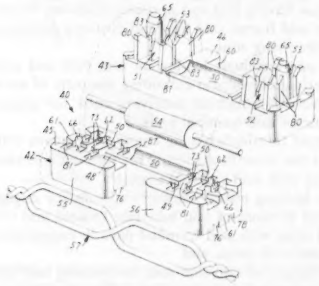
## 3,865,460
## COMPONENT CONNECTOR

Thomas M. Cherney, and John O. Knudson, both of Minneapolis, Minn., assignors to Minnesota Mining and Mfg. Co., Saint Paul, Minn.

Filed Apr. 30, 1973, Ser. No. 355,456
Int. Cl. H01r 9/08
U.S. Cl. 339—98 7 Claims



1. In a connector of the type comprising first and second body portions each having opposite end surfaces, opposite side surfaces, a mating surface, and an outer surface opposite said mating surface; and means for positioning and retaining the body portion in a closed position with said mating surfaces in contact, said first body portion having two channels in its mating surface each adapted to receive a wire, and said body portions having depressions in said mating surfaces defining, when said body portions are in their closed position, a cavity adapted to receive an electrical component having a contact wire extending from each of its ends, said connector further comprising two resilient contact members each mounted in said second body portion and having fingers defining spaced wire receiving slots therebetween, one contact element having fingers extending across one of said channels and one end of said cavity and the other contact element having fingers extending across the other of said channels and the other end of said cavity when said body portions are in said closed position so that said contact elements will electrically connect a component in said cavity to wires in said channels; the improvement, wherein:

the first body portion has two spaced projections defining one side surface and has an opening between said projections along said one side surface between said mating surface and said outer surface, one end of the component receiving cavity is adjacent one of said projections and the other end of the component receiving cavity is adjacent the other of said projections, and one of said channels extends across one of said projections from one of said end surfaces to said opening and the other of said channels extends across the other of said projections from the other of said end surfaces to said opening.

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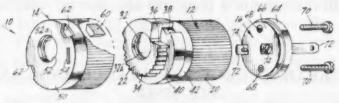
## 3,865,461
## HEAVY DUTY ELECTRICAL CONNECTOR AND STRAIN RELIEF THEREFOR

Melvin Ludwig, Great Neck, N.Y., assignor to Eagle Electric Mgf. Co. Inc., Long Island City, N.Y.

Filed Oct. 10, 1973, Ser. No. 405,027
Int. Cl. H01r 13/58
U.S. Cl. 339—103 R 9 Claims



9. A heavy duty electrical connector adapted to be secured to an end of an insulated electrical cable having conductive cores, said connector comprising:

a. a body section including a transverse wall having an eccentrically disposed through opening for passing the cable therethrough;

b. a cap section telescopically associated with said body section, said cap section including a transverse wall having an eccentrically disposed through opening for passing the cable therethrough, said openings being of the same radius of eccentricity, said opening in said cap section initially being in substantial alignment with said opening in said body section, said cap section being angularly rotatable relative to said body section in a first direction to progressively shift said openings out of alignment thereby to distort and clamp the insulation of the cable between opposed edges of said openings;

c. means limiting the angular rotation of said cap section to said first direction so as to lock said cap in cable clamping position, said limiting and locking means comprising a ratchet and a cooperating pawl,

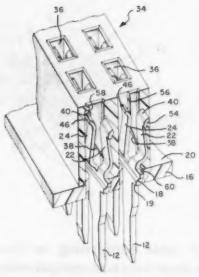
d. contacts carried by said body section, said contacts including means for electrically and mechanically coupling the conductive cores of the cable thereto; and

e. manually operable means for selectively disabling the limiting and locking means.

## 3,865,462
## PRELOADED CONTACT AND LATCHABLE HOUSING ASSEMBLY

**Robert Franklin Cobaugh, Elizabethtown, and James Ray Coller, Mechanicsburg, both of Pa., assignors to AMP Inc., Harrisburg, Pa.**

**Filed Mar. 7, 1973, Ser. No. 338,803**
**Int. Cl. H01r** *13/50, 13/12*
**U.S. Cl. 339—176 M** **5 Claims**



1. A connector comprising:

a terminal having a post portion integral with a bifurcated section defining a pair of resilient leaf spring contacts pivotable by resilient cantilever deflection in mutually exclusive planes of pivotable motion, said leaf spring contacts having laterally opposed contact making surfaces which together define a receptacle having a given width,

a housing having interior sidewalls defining an opening receiving said leaf spring contacts,

first opposing sidewalls of said opening spaced apart by a distance slightly greater than said given width and having respective undercut and respectively oppositely inclined sidewall portions camming corresponding leaf spring contacts resiliently in cantilever deflection and in opposite directions within said mutually exclusive planes of pivotable motion,

said leaf spring contacts having means in engagement with said undercut sidewall portions for maintaining said leaf spring contacts in oppositely deflected positions to define a receptacle extending therebetween,

second opposing sidewalls of said opening being initially in spaced relationship from said leaf spring contacts,

said leaf spring contacts being further resiliently pivotable by resilient cantilever deflection in said opposite directions to enlarge said receptacle for receipt of a male terminal therein, and

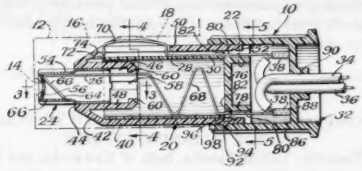
said leaf spring contacts being engageable against said second opposite sidewalls of said opening to limit said resilient cantilever deflection in said opposite directions.

## 3,865,463
## ELECTRICAL ADAPTER PLUG

**Albert G. Busch, Carefree, Ariz., assignor to A. G. Busch & Co. Inc., Chicago, Ill.**

**Filed Nov. 12, 1973, Ser. No. 414,734**
**Int. Cl. H01r** *33/30*
**U.S. Cl. 339—176 R** **10 Claims**

1. An electrical connector for connecting electrical power leads to an electrical power source in cigarette lighter receptacles, said connector comprising, in combination, a unitary, substantially cylindrical housing having an outer periphery, sized and shaped for insertion into said receptacle, an axial bore at one end of said housing and an opening at the other opening of said housing, a peripheral opening in a side of said housing, a first contact member slidably carried in said axial bore and projecting axially outwardly beyond said housing for making electrical contact with a first source of electrical power in said receptacle, a closure member for said opening on said other end of said housing and defining a first enclosed chamber within said housing, cooperating interconnecting means unitary with and on both said housing and on said closure member for defining the sole means for interconnecting said closure member to said housing, a pair of spaced channel means defined between said housing and said closure member for providing communication between said chamber and the exterior of said housing, a first electrical conducting member positioned within said chamber and, at one end

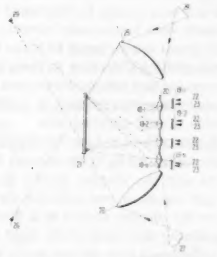


thereof, being in electrical conducting and biasing relationship with said first contact member, and at the other end thereof, projecting outwardly from said chamber through one of said channel means, and a second electrical conducting member positioned within said chamber and defining a second portion extending laterally outwardly beyond the periphery of said housing and through said peripheral opening in said housing, said second electrical conducting member providing electrical contact with a second power source in said receptacle, the rear portion of said second electrical conducting member projecting outwardly from said chamber and through the other of said spaced channel means.

## 3,865,464
## FOCUSED-IMAGE HOLOGRAM MEMORY

**Tadashi Kasahara, and Yoshiaki Kimura, both of Tokyo, Japan, assignors to Konishiroku Photo Industry Co. Ltd., Tokyo, Japan**

**Filed Apr. 10, 1972, Ser. No. 242,538**
**Claims priority, application Japan, Apr. 10, 1971, 46-22089**
**Int. Cl. G02b** *27/00*
**U.S. Cl. 350—3.5** **5 Claims**



1. A method of recording and reproducing images wherein a plurality of different, unrelated images are recorded in superposition as a hologram comprising the steps of:

a. providing a plurality of different, unrelated microimages and a corresponding plurality of optical lenses which are disposed spatially adjacent each other within apertures in a mask;

b. illuminating said images with a coherent light beam to focus real images in superposition through said optical lenses onto a photosensitive recording material disposed at the image forming position of said optical lenses, each image being recorded on the same area of the recording medium;

c. illuminating, simultaneously with the above illuminating step, the photosensitive recording material with a reference light beam having a coherent relationship with said light beam and focused at a point at a finite distance from the side of said recording material opposite to the side on which the images are focused, thereby recording superposed image holograms on said recording material;

d. reproducing the recorded images by illuminating said photosensitive recording material with a slightly extended source of incoherent light positioned at said point; and

e. positioning a mask containing an observation aperture so that the aperture is located in a selected position corresponding to a selected one of said plurality of lenses to permit observation of a corresponding selected one of the reproduced images.

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**3,865,465**

## COMPENSATION SYSTEM FOR A POLYGONAL MIRROR SCANNING SYSTEM

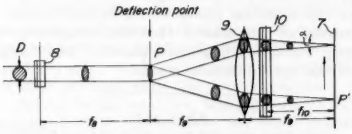
**Sizuo Tatuoka; Teiichi Taneda, both of Kawasaki, and Meiki Aiko, Tokyo, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan**

**Filed Mar. 19, 1973, Ser. No. 342,629**

**Claims priority, application Japan, Mar. 29, 1972, 47-31303**

**Int. Cl. G02b *17/00***

**U.S. Cl. 350—7** **1 Claim**




1. A compensation system for a light beam scanning system including a light source emitting a light beam, a polygonal mirror which rotates around its rotating axis so as to deflect an incident light beam emitted from the light source to scan a display screen along a scanning direction reflecting said light beam by said polygonal mirror and by focussing the reflected light beam by means of a converging lens having focal length $f_9$ on said display screen, the improvement comprising

a first cylindrical lens means having focal length $f_8$ inserted in the incident light beam path between the light source and the polygonal mirror so as to focus the incident light beam in one azimuth direction to form a beam having an elliptical cross section whose major axis defines a line on the polygonal mirror extending in a direction which is perpendicular to said rotating axis,

a second cylindrical lens means having focal length $f_{10}$ inserted in the reflected light beam path between the converging lens and the display screen so as to focus the reflected light beam in one azimuth direction to form a scan line on the display screen in a direction coincident with the scanning direction of the light beam,

said second cylindrical lens means being arranged so as to converge the output light beam from said coverging lens in a direction perpendicular to the scanning direction of said light beam in such a way that the light beam has a circular cross section section between said second cylindrical lens and said display screen, and

the ratio ($f_8/f_9$) of the focal length ($f_8$) of said first cylindrical lens means to the focal length ($f_9$) of the converging lens is equal to that ($f_8/f_{10}$) of the focal length ($f_9$) of said converging lens to the focal length ($f_{10}$) of said second cylindrical lens means, whereby the light beam is incident to the same position on the display screen even if the reflecting surface of the pologonal mirror and its rotating axis show imbalances.

**3,865,466**

## OPTICAL GUIDES

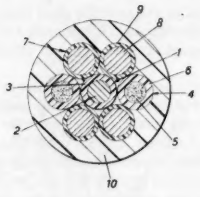
**Raymond Jeffrey Slaughter, 22 Ingleby Way, Chislehurst, England**

**Filed Nov. 8, 1973, Ser. No. 413,890**

**Claims priority, application Great Britain, Nov. 10, 1972, 52096/72**

**Int. Cl. C03c *15/00***

**U.S. Cl. 350—96 B** **18 Claims**




3. An optical cable comprising an elongate central core consisting of at least one non-optical reinforcing member, a plurality of optical bundles each comprising a group of fibres including at least one optical fibre, said optical bundles being arranged together in at least one stranded layer about the core and, surrounding the stranded body so formed, an outer protective sheath, the or each reinforcing member being of such a material and of such a cross-sectional area having regard to the material or materials and cross-sectional area of the bundles that the reinforcing member or members at least substantially reduces or reduce the strain that would otherwise be imparted to each bundle when the cable is stressed in such a way as to tend to subject each or any optical fibre of the bundle to a tensile force.

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**3,865,467**

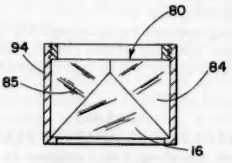
## RETROREFLECTING BEAM SPLITTER AND APPARATUS FOR MEASURING GRAVITY GRADIENTS EMBODYING THE SAME

**Peter C. Von Thuna, Lexington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.**

**Filed Aug. 7, 1970, Ser. No. 62,070**

**Int. Cl. G02b *5/12***

**U.S. Cl. 350—102** **9 Claims**

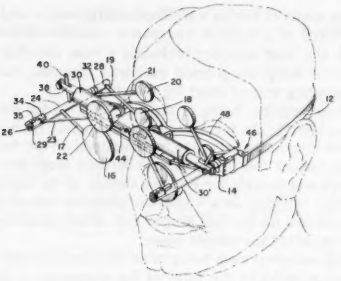



1. A retroreflecting beam splitting optical device comprising a solid corner cube having three surfaces which are partially reflecting and partially transmitting and three optical elements formed of a material having the same index of refraction as the material from which said corner cube is made, one of said elements being affixed to essentially the entire area of each of said three surfaces, said optical elements being shaped to define in combination with said corner cube a geometrical configuration having a flat surface parallel to the flat surface forming the base of said corner cube.

## 3,865,468
## HEAD-WORN TELESCOPIC VIEWING APPARATUS

Harry F. Holcomb, 6800 N. Eastern Ave., Oklahoma City, Okla. 73111

Filed Mar. 1, 1973, Ser. No. 337,086
Int. Cl. G02b 25/00, 7/08, 15/12
U.S. Cl. 350—146 8 Claims

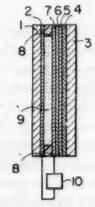


1. A head-worn viewing apparatus for use in the performance of surgery or other operations requiring moderate magnification and allowing freedom of a user's hands for various tasks of the operation comprising in combination a group of eye lens elements and a group of field lens elements mounted on a frame to be worn on the head of the user wherein said group of eye lens elements includes at least two lenses, one of which is normally fixed in a viewing position and a second of which is supported on a rotatable arm, said group of field lens elements includes at least two lenses which circumferentially spaced from each other and are each supported on a rotatable arm whereby at least one of said field lens elements is selectively adjustable to a viewing position to form a relatively low power telescope with said eye lens element fixed in viewing position and others of said eye and field lens elements are selectively adjustable to said viewing position to form a relatively higher power telescope with said eye lens element fixed in viewing position, power means actuatable to automatically adjust said lens elements into said viewing position, and a foot control member for actuating said power means, and each of said rotatable arms are fixedly secured to a common rotatable member so that upon actuation of said power means by said foot control member each of said rotatable arms and the lens element supported thereon is simultaneously rotated.

## 3,865,469
## LIQUID CRYSTAL DISPLAY DEVICE

Komei Asai, Hirakata; Masakazu Fukai, Nishinomiya, and Akio Moriyama, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 3, 1974, Ser. No. 430,508
Claims priority, application Japan, Jan. 18, 1973, 48-8789
Int. Cl. G02f 1/16
U.S. Cl. 350—160 LC 4 Claims

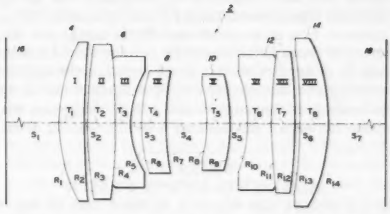


1. A liquid crystal display device comprising;
a pair of spaced glass substrates,
liquid crystal including pleochromatic dye interposed between said glass substrates,
a transparent thin film electrode disposed on an inner surface of one of said glass substrates,
a dyed metal oxide thin film layer disposed on an inner surface of the other of said glass substrate,
a transparent thin film electrode disposed on said metal oxide thin film layer, and
means for externally applying voltage across said transparent thin film electrodes.

## 3,865,470
## VARIABLE MAGNIFICATION LENS SYSTEM

George L. McCrobie, Upland, and Roscoe J. Donnel, Glendale, both of Calif., assignors to Xerox Corp., Stamford, Conn.

Filed Sept. 4, 1973, Ser. No. 393,844
Int. Cl. G02b 15/18
U.S. Cl. 350—184 3 Claims

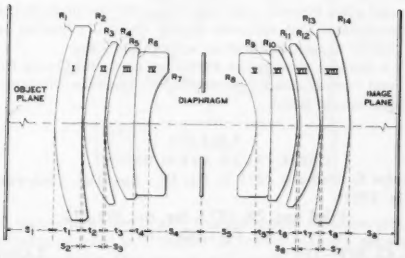


1. A variable magnification lens for use between fixed conjugates and including the following components in optical alignment:
a first positive convex-concave meniscus lens I;
a second positive double convex lens element II;
a third negative double concave lens element III;
said second and third elements forming a doublet,
a fourth positive convex-concave meniscus lens IV;
a fifth positive concave-convex meniscus lens V;
a sixth negative double concave lens element VI;
a seventh positive double convex lens element VII;
said sixth and seventh elements forming a doublet,
an eighth positive concave-convex meniscus lens VIII,
said second and third elements and said fourth and fifth lenses being fixed relative to each other as a unit,
said first and eighth lenses and said sixth and seventh elements being movable relative to said unit,
the entire variable magnification lens being movable between fixed conjugates.

## 3,865,471
## LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE

George L. McCrobie, Upland, Calif., assignor to Xerox Corp., Stamford, Conn.

Filed Jan. 2, 1974, Ser. No. 430,269
Int. Cl. G02b 9/62, 13/24
U.S. Cl. 350—215 1 Claim




1. A symmetrical type copying lens system having an aperture of substantially *f*/3.2 magnifying the object format by 1:1

magnification, said lens system being corrected for spherical abberation and chromatic abberation including secondary color, lateral and longitudinal chromatism, coma, astigmatism, distortion and field curvature, comprising:

a. a front compound component including lens element I of positive power, lens element II of positive power, lens element III of positive power, and lens element IV of negative power between the object plane and diaphragm;

b. a back compound component including lens elements V, VI, VII, and VIII the same general configuration as lenses IV, III, II and I respectively, arranged in a complementary manner in the rear portion of the lens system in order to achieve a symmetrical lens system;

c. constructional data relating to said lens system having comprehensive values as given in the chart hereinbelow wherein $S_1$ designates the air space between the object plane and lens element I, $S_2$ designates the air space between lens elements I and II, $S_3$ designates the air space between lens elements II and III, $S_4$ designates the air space between lens element IV and the diaphragm opening, $S_5$ designates the air space between the diaphragm opening and lens element V, $S_6$ designates the air space between lens elements Vi and VII, $S_7$ designates the air space between lens elements VII and VIII, $S_8$ is the air

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**3,865,472**

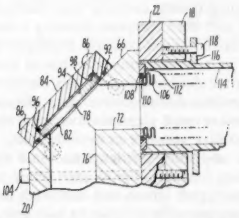
## MIRROR MOUNT FOR A LASER

**James Lee Hobart, and Wayne S. Mefferd, both of Palo Alto, Calif.**

**Division of Ser. No. 778,072, Nov. 22, 1968. This application Apr. 24, 1972, Ser. No. 247,202**

**Int. Cl. G02b** *5/08*

**U.S. Cl. 350—310** **1 Claim**



**1.** A mirror mount for mounting a laser mirror on a body in communication with a gas laser medium which comprises:

A. a body having a flat mirror support face thereon and a bore extending through said body from said face,

B. a laser mirror engaging said mirror support face and covering said bore,

C. a mounting plate on the opposite side of said mirror from said body and mounted on said body with said mounting plate having a central area adjacent to said mirror, a peripheral seal between said body and said plate outside the periphery of said mirror,

D. a resilient O-ring compressed between said mirror and said plate between said central area of said plate and said peripheral seal with said O-ring resiliently holding said mirror against said mirror support face, and

E. a through passageway extending past said O-ring from said central area for preventing air pressure differentials across said mirror.

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**3,865,473**

## SPECTACLE ATTACHMENT

**Carolyn G. Roberts, 2275 E. Bay Dr., Apt. 102, Clearwater, Fla. 33516**

**Filed Aug. 28, 1973, Ser. No. 392,272**

**Int. Cl. G02c** *5/16*

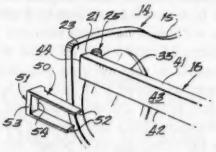
**U.S. Cl. 351—113** **2 Claims**

**1.** A spectacle attachment intended to be attached to conventional spectacles having a lens holding frame and a pair of temples each connected at their butt ends to an associated temporal end portion of the frame by a temple hinge, the hinged butt end of each temple disposed in close juxtaposition with the adjacent interior temporal end portion of the frame when the temples are in head engaging position extending substantially normal to the plane of the frame, each temple having a hinged end, an outer end, top and bottom edges, and interior and exterior surfaces, the spectacle attachment comprising:

a body member having a U-shape configuration and manufactured of a resilient transparent silicone rubber material, the body member including a base member with a pair of integrally formed parallelly disposed outwardly depending spaced apart leg members;

said base member being in the form of a wedge extending transverse to the leg members and tapering from a maximum thickness adapted to be positioned on the end of the butt hinged end of the temple furthest from the temple hinge and nearest the exterior surface of the temple, the wedge tapering to a minimum thickness adapted to be positioned on the butt hinged end of the associated temple adjacent the temple hinge;

said leg members each being of an identical size and configuration being in the form of flat elongated rectangular configurations each having one edge joined integrally with a peripheral side edge of the base member with each leg projecting outwardly therefrom in the same direction, the leg members spaced apart the approximate height of the associated temple and adapted to be longitudinally aligned with and secured to the hinged butt end of the temple with the interior surface of each of the leg members disposed in juxtaposition with the top and bottom edges respectively of the associated temple and with the interior surface of the base member disposed adjacent the end of the hinged butt end of the temple;



said leg members and said base member each adapted to be trimmed by the use of a knife, scissors and the like to custom fit the body member to the spectacle temple in an aesthetically pleasing manner providing a refined appearance thereto;

said base member being of a thickness adapted to be inserted intermediate the hinged butt end of each temple and the adjacent interior temporal portion of the frame to be compressingly engaged therebetween when the temples are moved into the head engaging position with the resilient material of the base member thus exerting an outwardly directed force against the temple hinged butt end in a manner urgingly biasing the temple rotatedly inwardly about the temple hinge against the head of the wearer;

a layer of pressure sensitive adhesive means disposed on each of the opposed interior confronting surfaces of each of the leg members and adapted to adhesively secure the leg members to the top and bottom edges respectively of the associated hinged butt end of the temple on which the body member is mounted, the body member once secured to the temple being movable therewith in a manner not interfering with the operation of the spectacles while yet being positioned for use each time the temples are opened from the frame in position to be placed about the head of the wearer; and

whereby the spectacle attachment requires no alteration of the frame or temples when affixed thereto and operable therewith.

## 3,865,474

### SYSTEM FOR SYNCHRONIZING MOTION PICTURE APPARATUS WITH TAPE RECORDER

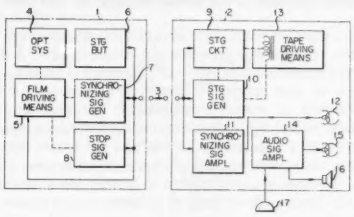
**Chihiro Aoki, Aichi, and Hiromichi Sakai, Ichinomiya, both of Japan, assignors to Elmo Co. Ltd., Nagoya, Aichi Prefecture, Japan**

**Filed Sept. 19, 1973, Ser. No. 398,781**

**Claims priority, application Japan, Sept. 25, 1972, 47-95200**

**Int. Cl. B03b** *31/04*

**U.S. Cl. 352—22** **11 Claims**




**1.** A system for synchronizing a motion picture apparatus including a motor, which transports a length of motion picture film and attains a steady-state speed substantially instantaneously after the current supply thereto, with a tape recorder including a motor, which transports a length of magnetic tape and takes a relatively long time as compared with that taken by the motor of the motion picture apparatus to attain a steady-state speed, said system comprising: circuit means for starting the motor of the tape recorder in response to starting operation of the motion picture apparatus; means for driving the magnetic tape after the starting of the tape recorder motor with the delay of a time at least necessary for the tape recorder motor to attain the steady-state speed; means for generating a starting signal to start the motor of the motion picture apparatus to thereby commence the transportation of the motion picture film substantially at the same time point as the transportation of the magnetic tape; and means for generating a stop signal, when the operation of the motion picture apparatus is released, to stop the motions of the motors.

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## 3,865,475

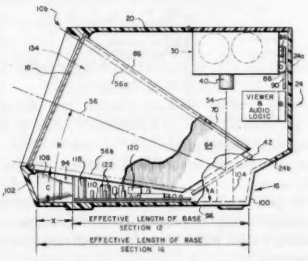
### MOTION PICTURE VIEWER WITH SOUND SYSTEM

**Herbert L. Hardy, 37 Normandy Dr., Sudbury, Mass. 01776; Joseph E. Murray, Jr., 27 Alpine St., Malden, Mass. 02148, and William R. Wray, 47 Bellaire Rd., Roslindale, Mass. 02131**

**Filed June 28, 1973, Ser. No. 374,640**

**Int. Cl. G03b** *31/02*

**U.S. Cl. 352—34** **2 Claims**




**1.** A motion picture viewer system that is convertible from an image projection mode of operation to an image projection and sound reproduction mode of operation, said viewer system comprising:

a main housing section formed in part by a rear projection screen and including an open bottom;

projection means in said main housing section for projecting image-bearing light towards said open bottom of said main housing section;

a first hollow base section locatable in closing relation with said open bottom when said viewer is operable in the image projection mode of operation, said first base section having a given length between leading and trailing ends thereof and being dimensioned so that said rear projection screen extends forwardly of said leading end of said base section by a predetermined distance, said first base section further including first means for mounting reflecting means in a predetermined spacial relationship with said projection means and said rear projection screen for reflecting the image-bearing light onto the rear of said rear projection screen;

a second hollow base section loctable in closing relation with said open bottom of said main housing in place of said first base section when said viewer is operable in the image projection and sound reproduction mode of operation, said second base section being longer between leading and trailing ends thereof than the given length of said first base section such that the distance between said rear projection screen and said leading end of said second base section is smaller than the predetermined distance between said rear projection screen and said leading end of said first base section, said second base section including second means for mounting reflecting means in the same predetermined spacial relationship with said projection means and said rear projection screen as when said first base section is located in operative closing relation with said open bottom of said main housing section; and

a portion of a sound system including a loud speaker mounted in said second base section, said loud speaker being positioned adjacent said leading end of said second base section and occupying a space in said second base section attributable to the greater length of said second base section as compared to said first base section.

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## 3,865,476

### CINEMATOGRAPHIC APPARATUS

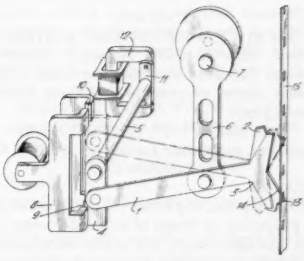
**Jean Thevenaz, Grandson, and Claude Kreienbuhl, Yverdon, both of Switzerland, assignors to Bolex International SA, Saint-Croix, Switzerland**

**Filed Dec. 26, 1973, Ser. No. 428,104**

**Claims priority, application Switzerland, Jan. 4, 1973, 186/73**

**Int. Cl. G03b** *1/22*

**U.S. Cl. 352—191** **6 Claims**



**1.** Intermittent film driving mechanism for a motion picture apparatus coupled to a shutter device for creating open and closed phases for film therein, said mechanism comprising a claw device of the sliding claw type, an eccentric cam means for driving said claw device and being rotatable at a constant

rate in the same direction and a control means for preventing the claw device from operatively engaging the film perforations, said claw device comprising two symmetric oppositely facing claws, rigidly fixed together, which engage the film perforations respectively during forward and backward transportation of said film, the ratio of closed phases and complete revolutions of the eccentric cam means is 4 to 3 and in which the control means comprises an electromagnet for preventing said claws from engaging the film at least during said open phases.

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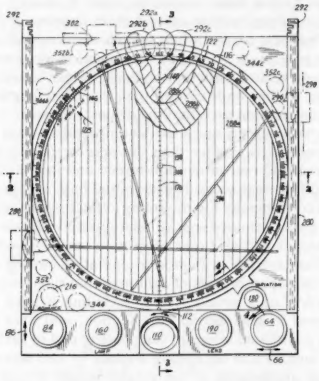
**3,865,477**

## NAVIGATION DEVICE

**Fred C. Gast, 15 Cerro Verde Dr., Ocean Springs, Miss. 39564**

**Filed Feb. 12, 1971, Ser. No. 115,019**
**Int. Cl. G03b** *21/00, 21/26*
**U.S. Cl. 353—11** **40 Claims**



1. Navigational device comprising, in combination, a housing supporting a projection screen, means mounted with said housing for supporting a miniature navigational chart, means for projecting an enlarged image of at least a portion of said chart on said screen and a plurality of line of position indicators each of which has a single linear element to define only a single line of position, means for independently manually rotating said line of position indicators relative to said screen for setting to a desired bearing or heading and means for independently manually translating said line of position indicators relative to said screen while maintaining the set bearing thereof for indicating relative bearing sights.

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**3,865,478**

## MICROFILM PROJECTING SYSTEM

**Shingo Ooue; Hiroyuki Ueda; Masakazu Hashiue; Makoto Murako-shi; Toshitaka Suwama, and Masaru Noguchi, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

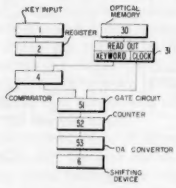
**Filed Nov. 4, 1971, Ser. No. 195,761**
**Claims priority, application Japan, Nov. 4, 1970, 45-96479**
**Int. Cl. G03b** *23/12*
**U.S. Cl. 353—26** **3 Claims**

1. A microfilm projecting system of the type having imaging means for projecting an image of selected frames of a microfilm loaded into said system, said system comprising:

a. a register for temporarily storing information therein,

b. a key input means for entering into said register information representing a keyword designating the information content of a frame of said microfilm,

c. an optical disc memory having indicia thereon representing frame addresses and frame keywords designating respectively the address of a frame of said microfilm and the information on a frame of said microfilm, said indicia being positioned on said disc so that a keyword and frame address applicable to a single frame appear on the same radial part of said disc but at different distances from said disc center on said radial part, said indicia designating frame address consisting of optically readable clock signalling marks positioned circumferentially on said disc, the number of said clock signalling marks from a given position on the circumference of said disc to any other position on the circumference on said disc being the said designation of said frame address of the microfilm frame whose information is designated by the keyword at said other position in the circumference on said disc,




d. optical means for reading out sequentially the indicia on said optical disc memory including said indicia representing keywords and said clock signalling marks and for converting said read-out indicia into signals representing read-out keywords and clock signals, respectively,

e. circuit means connected to said register and to said read-out means for counting the said clock signals until said signals representing read-out keywords match the keyword information in said register, said accumulated count representing a frame address, and

f. a shifting device means responsive to said frame address accumulated by said circuit means for relatively shifting said microfilm and said imaging means to result in the projection of a frame of said microfilm corresponding to said last mentioned frame number.

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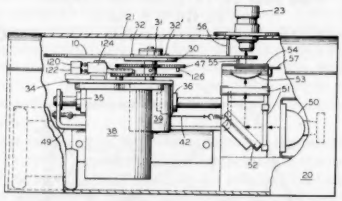
**3,865,479**

## RANDOM ACCESS PROJECTOR AND MULTI-FRAME CARTRIDGE THEREFORE

**George L. Frye, Jr., and Herman B. Gibson, Jr., both of Orlando, Fla., assignors to Educational Computer Corporation, Strafford, Pa.**

**Filed July 23, 1973, Ser. No. 381,774**
**Int. Cl. G03b** *23/10*
**U.S. Cl. 353—110** **18 Claims**



1. A projector comprising:

stationary projection lens means, said lens means having an optical axis;

means for generating a light beam, said light beam generating means being displaced from said lens means and providing a light beam aligned with the optical axis of said lens means;

a transparency storage medium, said storage medium including a plurality of transparencies arranged in a frame pattern which defines a spiral;

movable table means for removably supporting said transparency storage medium in a plane generally transverse to said lens means optical axis, said storage medium extending from said table means into the space between said lens means and light beam generating means;

motor means, said motor means including a motor having a rotatable output shaft;

a platform;

means mounting said platform for movement in a direction transverse to said lens means optical axis;

means mounting said motor means from said platform;

rotational drive means coupling said motor means motor output shaft to said table means for causing rotation of said table means;

linear drive means coupling said motor means motor output shaft to said platform mounting means whereby rotation of said shaft is translated to linear motion of said platform and rotational and translational motion may be simultaneously imparted to said table means to present said storage medium frames seriatim on said optical axis; and control means for said motor means, said control means being responsive to input signals commensurate with the location in the pattern of a desired transparency to cause the motor to operate so as to position the storage medium with the desired trasparency on the lens means optical axis.

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**3,865,480**

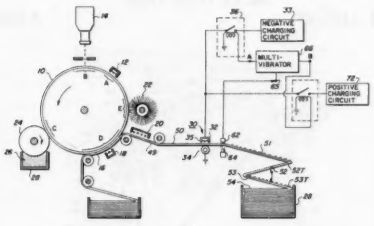
## ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING

**Melvin E. Swanberg, Madre, Calif., assignor to Xerox Corp., Stamford, Conn.**

**Filed Dec. 20, 1973, Ser. No. 426,991**

**Int. Cl. G03g** *15/00*

**U.S. Cl. 355—3 R** **14 Claims**




**4.** In an apparatus for processing a fan fold paper stack in which at least a portion of the paper stack comes in contact with a printing member and is then stacked in a stacking bin, the improvement comprising:

means, disposed between said printing member and said bin, for charging selected sheets of said portion of said fan fold paper stack.

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**3,865,481**

## COPYING MACHINE EQUIPPED WITH SYNCHRONOUS EXPOSING MECHANISM

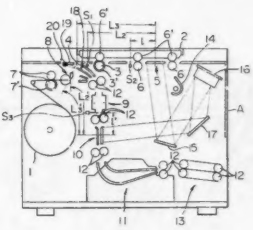
**Takaji Washio, and Tatsuo Aizawa, both of Osaka, Japan, assignors to Mita Industrial Co. Ltd., Osaka, Japan**

**Filed June 12, 1973, Ser. No. 369,177**

**Int. Cl. G03g** *15/00*

**U.S. Cl. 355—13** **10 Claims**

**1.** A copying machine comprising a passageway for transferring an original, an original exposing section located alongside the transferring passageway for exposing the original, a mechanism for transferring the original at a predetermined speed through said original exposing section, a first original detecting member provided near the upstream end of said original transferring passageway, a second original detecting member provided upstream of said original exposing section and a transferring roller for synchronization provided between said first and second original detecting members; and a passageway for transferring a roll of sensitive paper, a sensitive paper exposing section located alongside the transferring passageway for exposing the sensitive paper, a mechanism for transferring the sensitive paper through the transferring passageway at the same speed as that of transferring the original, a sensitive paper detecting member provided upstream of said sensitive paper exposing section, a feed mechanism provided at an upstream end of said sensitive paper transferring passageway for delivering a roll of the sensitive paper, and a cutting mechanism for cutting the roll of the sensitive paper delievered by said feed mechanism, the distance between the center of said original exposing section and said first original detecting member being equal to that between the center of



said sensitive paper exposing section and the position at which to cut the sensitive paper roll, the distance between the center of said original exposing section and second original detecting member being equal to that between the center of said sensitive paper exposing section and said sensitive paper detecting member, said sensitive paer feed mechanism beginning to feed the sensitive paper when the forward end of the original has reached said second original detecting member and ceasing to supply it when the rear end of the original has passed said first original detecting member, said paper cutting mechanism cutting the sensitive paper when the rear end of the original has passed the first original detecting member and said synchronization transferring roller ceasing to rotate when the forward end of the original has reached said second original detecting member and resuming its rotation when the forward end of the sensitive paper has reached said sensitive paper detecting member.

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**3,865,482**

## ELECTROSTATOGRAPHIC COPYING MACHINE

**Dennis M. Bendall, Coleford; William R. Harris, Tutshill, near Chepstow; Peter Summers, Coleford; Raymond S. Pyart, Churchdown; Jeffrey Kew, Upton Saint Leonards; Michael C. D. Sherborne, Marlborough; Alistair J. Caldwell, Drybrook; Peter M. Thorp, Lydbrook, and John A. Jones, Coleford, all of England, assignors to Rank Xerox Ltd., London, England**

**Filed June 19, 1973, Ser. No. 371,654**

**Claims priority, application Great Britain, June 23, 1972, 29653**

**Int. Cl. G03g** *15/00*

**U.S. Cl. 355—14** **3 Claims**

**1.** An electrophotographic reproducing machine comprising

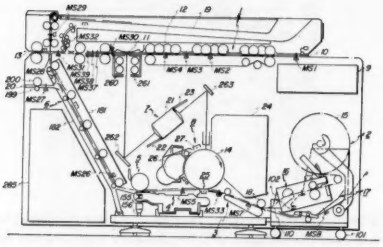
an electrophotographic member mounted for movement past copying processing stations including charging means for applying a charge to the surface thereof,

a document handler means for feeding a document to be copied past an exposure slit at a predetermined speed, said document handler means including means for reversing the document and re-feeding it past the slit repeatedly to produce a plurality of copies,

an optical system comprising means for illuminating the document as it is fed past said exposure slit, and for forming an image of the document at the slit on said electrophotographic surface, said optical system incorporating a lens and mirror means causing an electrostatic latent image of the document to be formed on said surface in a selected one of a plurality of predetermined image sizes,

a copy material feeder means for feeding copy material towards said electrophotographic surface including means to cut a sheet of material from a roll of the copy material with a length proportional to the length of said document to be copied, and alternative means for feeding pre-cut sheets of copy material, and registration with the leading edge of the image in said surface,

means for developing the electrostatic latent image on the said electrophotographic surface,



means for transferring the developed image to said copy material sheet,

means for cleaning said surface,

means for fixing the developed image on the copy sheets,

means for delivering the copy sheets bearing the fixed image to the front or rear of the machine,

said document handler means includes means defining a front and rear document path and means for delivering said document along one of said paths to the front or rear of the machine at the option of a machine operator,

said means for delivering said copy sheets includes means defining a front and rear copy path and means for transporting said copy sheets to the front or to the rear of the machine, and said document path to the rear of the machine intersecting the copy sheet path to the front of the machine, and

circuit means to prevent the document from being delivered to the rear if the copy sheets are delivered to the front.

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**3,865,483**

**ALIGNMENT ILLUMINATION SYSTEM**

**Walter J. Wojcik, Poughkeepsie, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Mar. 21, 1974, Ser. No. 453,235**

**Int. Cl. G01b** *11/26*; **G03b** *27/52*, *27/70*

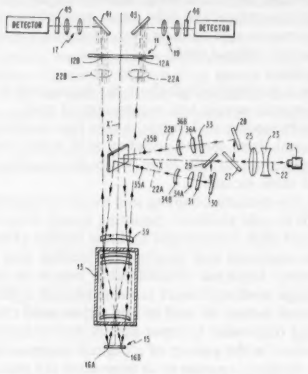
**U.S. Cl. 355—43** **9 Claims**

1. An optical illumination system for an optical alignment apparatus comprising:

means to form two channels of polarized light having different directions of polarization,

means to make the cross section of said channels elliptical; means to direct each of said channels to different areas of a first object which is to be aligned with a second object; lens means located in the path of said channels to image said areas of said first object in the plane of corresponding areas on said second object; and

optical pickup means arranged to view each channel, each pickup means including a polarizer which passes only the



light which is properly polarized for its respective channel.

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**3,865,484**

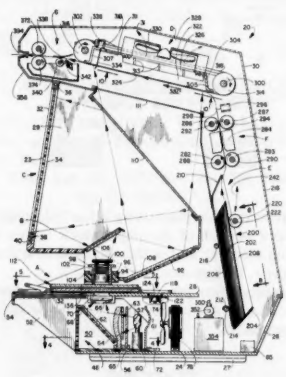
**VIEWER-COPIER APPARATUS**

**Stanley W. Heldenbrand, 6271 Shadybrook Ln., Apt. 296; David L. Johnson, 6022 Village Glenn Dr., Apt. 4129, both of Dallas, Tex. 75206, and Neil H. Mote, 418 Lookout Dr., Richardson, Tex. 75080**

**Division of Ser. No. 166,953, July 28, 1971,. This application Sept. 28, 1973, Ser. No. 401,818**

**Int. Cl. G03b** *13/28*

**U.S. Cl. 355—45** **6 Claims**



1. An apparatus for viewing information and for selectively producing copies of said information on optically sensitive record medium, said apparatus comprising:

a hollow housing,

a transparent viewing screen means mounted with said housing,

means for selectively positioning said optically sensitive record medium at an exposure station in said housing,

optical means within said housing for producing and enlarging an image and for projecting said image on said screen means so that the information represented by said image can be viewed from the exterior of said housing and simultaneously directing said image to said exposure

station to expose said optically sensitive record medium, and

filter means within said housing for preventing ambient light entering said housing through said viewing screen means from reaching said record medium at said exposure station, said filter means comprising a first means intercepting the light energy corresponding to said ambient light and the light energy corresponding to said image for maximizing the degree of polarization of said ambient light energy while minimizing the degree of polarization of said image light energy, and a second means for preventing said so polarized ambient light energy from reaching said record medium and for allowing said so polarized image light energy to reach said record medium at said exposure station, thereby to filter out said ambient light.

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**3,865,485**

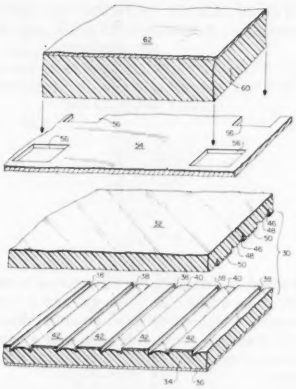
## CYLINDRICAL LENS BONDED MICROFICHE

**George J. Yevick, Leonia, N.J., assignor to Personal Communications Inc., Stamford, Conn.**

**Filed July 10, 1973, Ser. No. 377,929**

**Int. Cl. G03b** *27/62*

**U.S. Cl. 355—46** **13 Claims**



**1.** A composite microfiche formed of two laminar halves, each half defined by a generally flat substrate having parallel, spaced channels on one face thereof, each channel having a curved surface throughout its length to define a channel lens, the inter-channel surface on said one face being opaque, the two said halves placed with their channeled faces facing each other and with the channel lenses of one half crossing the channel lenses of the other half to define a projection lens at each crossing, one of said laminar halves carrying a photographic emulsion over a surface thereof.

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**3,865,486**

## AREA MEASURING DEVICE

**William B. Miles, Barrington, Ill., and John S. Copeland, Embourg, Belgium, assignors to Addressograph Multigraph Corp., Cleveland, Ohio**

**Filed June 4, 1973, Ser. No. 366,961**

**Int. Cl. G03b** *27/32*

**U.S. Cl. 355—64** **27 Claims**

**27.** A device for reproducing an original document on a sheet of copy paper comprising

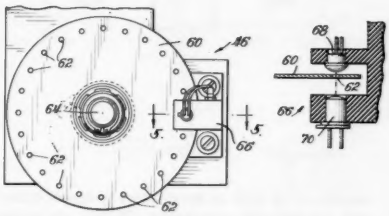
means for feeding said original document through said device along a path of travel,

means for illuminating said original document to form a latent image of said original document on said sheet,

means for developing said latent image to form a visual image of said original document on said sheet, and

means for determining the area of said original document, said area determining means comprising

means disposed across said path of travel of said original document for detecting a first dimension of said original document and for simultaneously providing a plurality of output signals, the number of said output signals being indicative of said first dimension, and a pulse source providing a predetermined number of clock pulses for a predetermined increment of linear



travel of said original document along said path of travel,

means for sampling and accumulating said output signals from said detecting means, said sampling and accumulating means being responsive to said clock pulses and said accumulated output signals for providing an indication of the total area of said original document, and means for inhibiting the generation of said area indicative signal until a plurality of clock pulses numerically equal to said number of said plurality of sensors have been provided by said source subsequent to the detection of said original document by at least one of said sensors.

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**3,865,487**

## OPTICAL VELOCITY METER PICK-UP HEAD

**Nils Ingvar Andermo, Enbyberg, Sweden, assignor to Hasler AG., Bern, Switzerland**

**Filed Apr. 3, 1973, Ser. No. 347,428**

**Claims priority, application Switzerland, Apr. 6, 1972, 4944/72**

**Int. Cl. G01p** *3/36*

**U.S. Cl. 356—28** **7 Claims**

**1.** In a pick-up head disposed on a rail vehicle for optical measurement of the velocity of the vehicle in relation to a stationary surface (**3**) adjacent to it and along which the vehicle moves (**5**), having

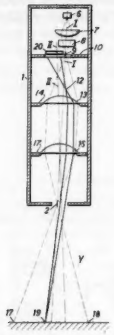
means (**6, 7, 8, 13, 16, 6', 7', 8', 13', 16'**) for illuminating a portion of said stationary surface (**3**);

two photoelectric converters (**20, 20'**) spaced apart in the direction (**5**) of movement of the vehicle;

two slit diaphragms (**11, 11'**) arranged in a common plane (**10**) parallel to said stationary surface (**3**) each in front of one of said photoelectric converters (**20, 20'**) and

extending perpendicularly to the direction (5) of movement of the vehicle;

optical means (13, 16, 13', 16') for projecting an image of said stationary surface (3) onto the plane (10) of said slit diaphragms (11, 11') so that each of said photoelectric converters (20, 20') receives light from one of two elongated surface increments (4, 4') forming parts of said illuminated portion of said stationary surface (3) and spaced apart in and extending perpendicularly to the direction (5) of movement of the vehicle and fixed in



relation to the pick-up head, whereby signals delivered by said photoelectric converters (20,20') are utilized for determining the velocity of the vehicle by correlation;

the improvement comprising

said optical means (13, 13', 16, 16') containing means (13, 13') for spreading the image of any point of the surface increments into a line in the plane (10) of said slit diaphragms (11, 11') and in the direction of the slits (11, 11', 11'') thereof so that the photoelectric converters (20,20') receive less light from the ends and more light from the middle of said surface increments.

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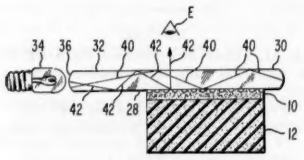
**3,865,488**

## FINGERPRINT DISPLAY SYSTEM UTILIZING A STORED FINGERPRINT

**Eddy Humberto Del Rio, Palm Beach, Fla., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 30, 1973, Ser. No. 420,667**
**Int. Cl. G06k** *9/08*
**U.S. Cl. 356—71** **9 Claims**




3. Apparatus for visually displaying a fingerprint comprising, in combination:

a member of transparent material structured so that diffuse light energy applied to said member is normally, substantially totally reflected internally between surfaces of said member;

means having erasably stored on a surface thereof the raised ridge pattern of said fingerprint to be displayed placable with the raised ridges of said pattern in contact with one of said surfaces of said member;

the presence of said ridges in contact with said one surface causing said light energy to be reflected externally of said member at points on a second surface of said member determined according to the location of said ridges on said one surface; and

means for applying said diffuse light energy to said member.

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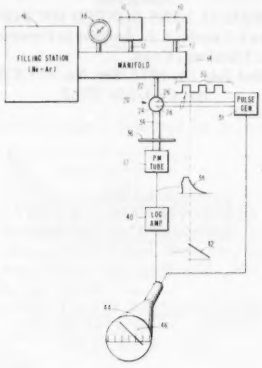
**3,865,489**

## ON-LINE DETECTION AND MEASUREMENT OF CONTAMINATING GASES DURING FILLING OF GAS DISPLAY PANELS

**Melvin Klein, Mount Kisco, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Jan. 8, 1974, Ser. No. 431,812**
**Int. Cl. G01j** *3/00*
**U.S. Cl. 356—85** **15 Claims**




1. A method of detecting the presence of a contaminating gas in a Penning mixture of a first gas and a second gas, the first gas having a higher ionization potential than said second gas and also having a metastable state with a potential higher than the ionization potential of said second gas, comprising the steps of:

a. exciting a sample of the mixture to cause a pulsed discharge therein;

b. removing the excitation; and

c. then detecting the time rate of decay of the radiation intensity of the second gas as an indication of the presence of a contaminating gas, said time rate of decay being faster than that for an uncontaminated Penning mixture of said first and second gases.

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**3,865,490**

## FILTER SPECTROGRAPH

**Jack J. Grossman, Manhattan Beach, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.**

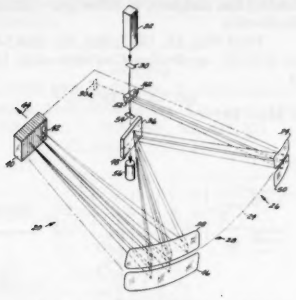
**Filed Aug. 29, 1973, Ser. No. 392,644**
**Int. Cl. G01j** *3/18, 3/40*
**U.S. Cl. 356—76** **11 Claims**

1. A filter spectrograph unit comprising:

a rejection filter including means for producing a first spectrum from input light entering an entrance aperture of said rejection filter, means for rejecting at least one selected spectral line of said first spectrum, and means for reforming the remaining spectral lines of said first spectrum into output light containing all of the original spectral information, less said at least one rejected spectral line, at an exit aperture of said rejection filter; and

a dispersing spectrograph including means for producing a second spectrum from input light entering an input aper-

ture of said dispersing spectrograph, said second spectrum being formed at an output aperture of said dispersing spectrograph, and said dispersing spectrograph being



coupled to said rejection filter whereby said output light of said rejection filter from said exit aperture thereof is directed into said input aperture of said dispersing spectrograph.

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**3,865,491**

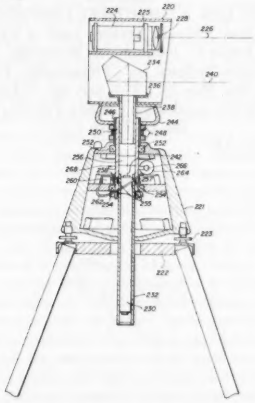
**SURVEYING INSTRUMENT TRACKING SYSTEM**

**William M. Hogan, North Little Rock, Ark., assignor to Blount & George, Inc., Jacksonville, Ark.**

**Continuation-in-part of Ser. No. 181,839, Sept. 20, 1971,. This application Feb. 4, 1974, Ser. No. 439,585**

**Int. Cl. G01b** *11/26*

**U.S. Cl. 356—152** **11 Claims**



**1.** An automatic elevation surveying system wherein a laser beam is aligned with a movable target comprising:

a support pedestal having a vertically disposed member attached thereto,

a laser beam source positioned within said member to project the laser beam in a vertical direction parallel to the axis of said member,

a pivotal housing mounted on said support pedestal,

prism means mounted in said housing with an input face of said prism means normal to the laser beam, whereby rotation of said prism means generates laser beams in a plane perpendicular to the original laser beam,

a beacon attached to the movable target and operable to emit electromagnetic signals,

electromagnetic signal detector means mounted to said housing,

motor means for rotating said housing and responsive to the output of said detector means for pivoting said housing toward said beacon such that said laser beam is aligned with said movable target and such that said laser beam continually impinges said movable target permitting determination of a predetermined elevation at said movable target in response to the location of the impingement of said laser beam on said target.

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**3,865,492**

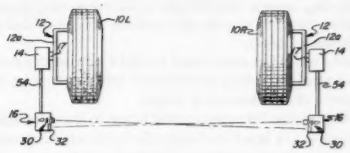
**APPARATUS FOR USE IN ALIGNING WHEELS**

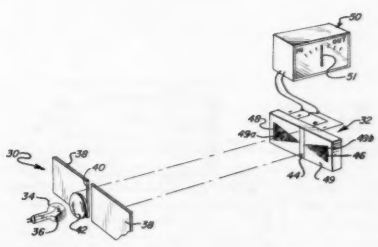
**Louis L. Butler, Baton Rouge, La., assignor to Bear Manufacturing Corp., Rock Island, Ill.**

**Continuation of Ser. No. 234,814, March 15, 1972, abandoned. This application Nov. 19, 1973, Ser. No. 417,228**

**Int. Cl. G01b** *11/00*

**U.S. Cl. 356—155** **20 Claims**





**1.** Apparatus for use in aligning vehicle wheels comprising means for projecting a directional beam of light, means for attaching said projecting means to a first wheel for projecting said directional beam with the longitudinal axis of said beam in predetermined angular relationship to a line generally parallel to the axis of rotation of said first wheel, said line lying in a generally vertical plane through the axis of rotation of said first wheel, and photosensitive means positioned to intercept said beam when such axis of rotation is within a range predetermined positions, and means responsive to said photosensitive means for indicating the position of said axis of rotation relative to a predetermined reference position.

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**3,865,493**

**APPARATUS FOR DIRECT ELECTRONIC MEASUREMENT OF IMAGES**

**Roger Roy Adams Morton, Penfield, N.Y., assignor to Bausch & Lamb Incorporated, Rochester, N.Y.**

**Division of Ser. No. 224,710, Feb. 9, 1972, abandoned, which is a continuation of Ser. No. 878,679, Nov. 21, 1969, abandoned. This application Aug. 14, 1973, Ser. No. 388,315**

**Int. Cl. G01b** *11/28*

**U.S. Cl. 356—158** **5 Claims**

**1.** Apparatus for generating a signal as a function of area or area dependent parameters of each particle in a particulate population sample, comprising:

an electron scanning tube having a gun end and a face end with an electron gun assembly positioned therewithin at the gun end thereof, a target also disposed within said tube adjacent the face end thereof and focusing and accelerating grids disposed between the gun assembly and the target, said electron gun assembly arranged to direct

an electron beam towards said target, said target including,

a transparent conductive layer,

a photoconductive layer, and

a transparent insulating layer sandwiched between said conductive and said photoconductive layers, said resulting sandwich target oriented within said tube so that said photoconductive layer faces said electron gun assembly;

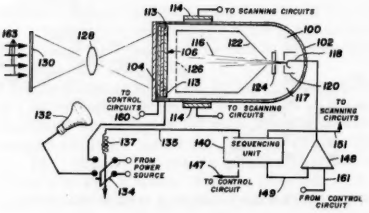
particulate population sample retaining means disposed outside of said tube before the face end thereof in general alignment with the sandwich target;

a lens positioned between said sample retaining means and said tube so that a focused image of each particle of said particulate population sample is presented on said sandwich target;

conducting means electrically contacting said photoconductive layer to provide for uniform charge of said photoconductive layer;

a control amplifier connected to said electron gun assembly to control the voltage potential of said electron beam with respect to said sandwich target;

scanning means for causing said beam to traverse said photoconductive layer in a controlled manner according to a predetermined pattern to intersect each image of each




particle of said particulate population sample focused on said sandwich target; and

a control circuit connected to said scanning means, said control amplifier and said conductive layer and responsive to current flow in said conductive layer for

disenabling said scanning means to cause said electron beam to pause whenever said electron beam intersects a particle image focused on said target for discharging of the photoconductive area coincident with the focused image of the particle and current flow from said conductive layer, occurring as a function of the discharging of the photoconductive area, exceeds a predetermined value, for the period during which said threshold current value is exceeded,

changing the voltage output of said amplifier so that the voltage potential difference between said electron beam and said sandwich target at each intersected image is reduced to a predetermined value, and

generating a measuring signal proportional to current flow in said conductive layer as a function of said period during which said beam is caused to pause at each intersected image of each particle of the particulate population sample, said measuring signal being a function of area or area dependent parameters of each particle of the particulate population sample.

**3,865,494**

## ABSORPTION PHOTOMETER

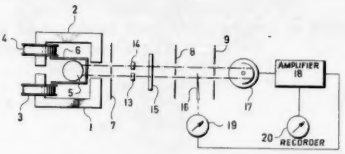
**Miroslav Pavlicek, and Miroslav Rosenbaum, both of Praha, Czechoslovakia, assignors to Ustav pro vyzkum rud, Praha, Czechoslovakia**

**Filed May 15, 1973, Ser. No. 360,543**

**Claims priority, application Czechoslovakia, May 16, 1972, 3300-72**

**Int. Cl. G01n *21/24***

**U.S. Cl. 356—201** **6 Claims**




**1.** A photometer comprising an electrical discharge tube as a radiation source, magnetic means provided in close proximity to the discharge part of the discharge tube, creating a magnetic flux coaxial with the radiating flux from the discharge tube, and causing a modulation of the radiating flux, a plurality of screens aligned with slots which select two substantially parallel radiating beams from the radiating flux, a measuring cell in the track of each of both radiating beams, one of said cells being adapted to receive a compound to be investigated, and a detector of radiation receiving the radiation of both radiation beams.

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**3,865,495**

## CUVETTE FOR A MICROSPECTROPHOTOMETER

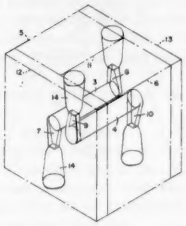
**Manuel C. Sanz; Georges Revillet, both of Geneva, Switzerland, and Edgar G. Johnson, Jr., Huntsville, Ala., assignors to Micromedic Systems, Inc., Philadelphia, Pa.**

**Filed May 24, 1973, Ser. No. 363,444**

**Claims priority, application Canada, Feb. 23, 1973, 164480**

**Int. Cl. G01n *1/10***

**U.S. Cl. 356—246** **2 Claims**



**1.** A cuvette of throughflow type having a main body formed of two blocks, an opaque septum positioned in a plane between the two blocks and adhered thereto, and two end plates each having an inside face adhered on a respective one of the opposite ends of the body thereby leaving an exposed face on each end plate, a pair of parallel longitudinal cylindrical passages extending through the main body, one of the passages extending through each of the blocks, the passages terminating in planes that are parallel to each other and extend perpendicularly to the length of the passages, the inside faces of the end plates closing the ends of the passages to provide end walls of the passages which lie in planes that are perpendicular to the passages, the exposed faces of the end plates, at least in those portions adjacent the end walls, lying in planes parallel to those of the end walls, the end plates being transparent throughout their thickness at least in those portions in alignment with the ends of the passages, a plurality of transverse channels, each thereof communicating with one

of the respective ends of the passages, and a plurality of sockets communicating with the channels for receiving the ends of conduits to supply and/or discharge a liquid through the channels of the passages.

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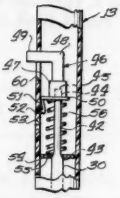
3,865,496

## COMBINATION PEN AND PENCIL WRITING DEVICE

Geoffrey Robbins, 2869 Dirheim Ave., Cincinnati, Ohio 45211

Filed Jan. 7, 1974, Ser. No. 431,331
Int. Cl. B43k *27/10, 24/12*
U.S. Cl. 401—17 3 Claims



1. A combination pen and pencil writing device comprising an elongated cylindrically shaped casing comprised of a housing member being of hollow dome shape at one end and having an axial opening of reduced diameter at said one end and being open at said other end and removably receiving on said other end a tubular cap member of substantially the same diameter as said housing member, means removably assembling said tubular cap member in end-to-end coaxial relation with respect to said other end of said housing member, a pair of elongated writing units disposed in said casing and extending axially therealong, one of said writing units being a ball point pen with the other of said writing units being a mechanical pencil, said writing units being mounted in said casing for axial movement along the axis of said casing with each of said writing units being separately movable between a writing position wherein the writing end of said unit projects through said reduced diameter opening of said housing member and to a retracted position wherein said writing end of said writing unit is disposed inwardly of said casing, spring means biasing each writing unit to its retracted position in said casing, a combined pushing member and locking means mounted on each of said writing units and operable to effect the axial reciprocal movement of each individual writing unit axially of said casing between their respective writing positions wherein said locking means retains said writing unit against retraction by said spring means, and said retracted position wherein said locking means permits said spring means to retract said writing unit into a position inwardly of said casing, said combined pushing member and locking means each comprises a pushing member comprised of a collar having a top surface and a bottom surface, a recess in said bottom surface adapted to tightly engage therein the adjacent end of said associated writing unit, an L-shaped operating arm having its base portion aligned with said collar member and projecting outwardly of the top surface thereof and having its leg portion projecting radially to the axis of the collar, an axially elongated slot provided in a side wall of said cap portion and adapted to receive said leg portion in a manner projecting therethrough for axial guidance thereof between a retracted and writing position of said writing unit, an annular flange formed integrally with the bottom surface of said collar and projecting radially outwardly therefrom, an axially extending arm formed integrally with a peripheral edge of said flange and extending downwardly therefrom in position adapted to be placed adjacent to an interior surface of said cap portion, said arm being manufactured of resilient material, and said arm terminating in a radially outwardly directed wedge portion, said cap portion provided with a recess adapted to be engaged by said wedge portion when said writing unit is in the operative writing position projecting outwardly of said casing.

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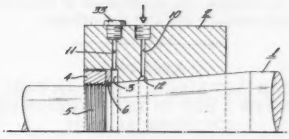
3,865,497

## PRESS FIT JOINTS FOR MOUNTING BY MEANS OF A PRESSURE MEDIUM

Axel Erland Bratt, Molndal; Oscar Evert Ingemar Holst, Goteborg, and James Gusten Ragnar Petre, Molndal, all of Sweden, assignors to SKF Industrial Trading and Development Company N.V., Amsterdam, Netherlands

Filed Feb. 28, 1972, Ser. No. 230,008
Claims priority, application Sweden, Mar. 3, 1971, 2685/71
Int. Cl. F16d *1/02*
U.S. Cl. 403—15 5 Claims



1. Press fit joint comprising inner and outer members having co-acting complementary tapered press fit surfaces, an annular piston means secured to one of said members and slidable relative to the other of said members, means defining an annular recess in said other member, said piston means being axially slidable in said recess and defining with it an annular enclosed chamber for a pressure medium, means defining a first channel in said outer member terminating in a circumferential groove communicating with said tapered surfaces and spaced axially from said annular chamber, means defining a second channel communicating with said annular chamber and plug means for selectively closing said second channel to the atmosphere, said first channel adapted to be connected to pressure medium whereby the pressure medium flows between the tapered surfaces and gradually fills the enclosed annular chamber when said second channel is closed to the atmosphere thereby to effect axial displacement of said inner and outer members relative to one another during mounting of the joint, said second channel being open to the atmosphere during dismounting of the joint to prevent pressure build-up in said annular chamber.

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3,865,498

## SLIP JOINT FOR STEEL POLES OR THE LIKE

Koichiro Okuto, Nishnomiya, and Toshio Kai, Tokyo, both of Japan, assignors to Sumitomo Metal Industries Limited, Osaka City, Japan

Filed Nov. 30, 1972, Ser. No. 310,786
Claims priority application Japan, Jan. 30, 1971, 46-96670
Int. Cl. E04h *12/08*
U.S. Cl. 403—292 3 Claims

1. In a slip joint located at the overlapping ends of telescoping tubes tapering between a larger end to a smaller end thereof and forming a pole when telescoped together, reinforcing means provided at said overlapping ends, said reinforcing means comprising at least one reinforcing flange secured to substantially the entire inner surface of the inner one of said tube ends and lying wholly within the overlap of said

ends, and said flange lying in a plane perpendicular to the longitudinal axis of said tubes, whereby the overlapping length

at said ends is reduced and the strength of the pole including the joint is substantially uniform throughout.

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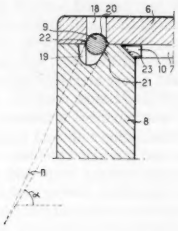
**3,865,499**

**MEANS FOR SECURING A CIRCULAR PART IN THE FORM OF A DISC IN THE INTERIOR OF A CYLINDRICAL PART**

**Jacques E. Flichy, Versailles, France, assignor to Ateliers Metallurgiques de Saint-Urban, Paris, France**

**Filed Mar. 5, 1973, Ser. No. 338,411**
**Claims priority, application France, Apr. 5, 1972, 72.11948**
**Int. Cl. F16d *1/06***
**U.S. Cl. 403—326** **4 Claims**



**1.** In combination, a cylindrical part having a tubular portion, a circular disc-shaped part positioned within said tubular portion and being subjected to an axial force thereon in a selected axial direction, and securing means for fixedly but releasably connecting said circular part to said cylindrical part, and securing means including an annular groove formed in the periphery of said circular part and a resilient keeper ring adapted to be fully positioned within said groove, said securing means also including an annular channel formed in the interior wall of said tubular portion with said keeper ring being resiliently expandable to extend into said annular channel for fixedly connecting said cylindrical and circular parts, comprising the improvement wherein said annular groove has a first side surface on the rearward side thereof as viewed in said selected direction which is inclined at an angle of less than 90° relative to the axis of said cylindrical part and extends at a slope which projects radially inwardly toward said axis and axially in said selected direction, and said annular channel having a second side surface thereon which is on the front side thereof as viewed in said selected direction and which is inclined at an angle of less than 90° relative to said axis, said second surface also being sloped radially inwardly toward said axis and axially in said selected direction, said first and second surfaces engaging said keeper ring on substantially diametrically opposite sides thereof and converging toward one another as they project towards said axis, whereby said keeper ring is tightly held within said annular channel to prevent separation of said parts when an axial force is imposed on said circular part in said selected axial direction and one of said parts having access opening means formed therein and communicating with said annular channnel for permitting said keeper ring to be displaced into said groove after said parts are assembled.

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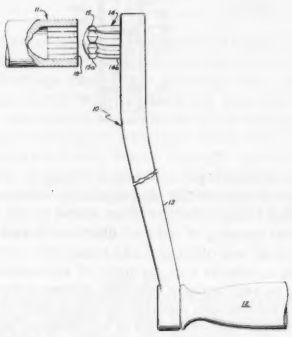
**3,865,500**

**LOCKING HANDLE**

**E. Strohm Newell, 2350 6th Ave., San Diego, Calif. 92101**

**Filed July 9, 1973, Ser. No. 377,694**
**Int. Cl. F16d *1/10***
**U.S. Cl. 403—359** **21 Claims**



**1.** A locking handle for turning a hub portion comprising:
a. a shaft locking member engageable with the hub portion and including a lower portion and a fixed upper portion,
b. said lower portion being movable with respect to the fixed upper portion,
c. at least one spline member disposed on the upper portion and the lower portion,
d. said upper portion and said lower portion each including a mating surface having an inclined surface portion, and
e. biasing means having a biasing force which urges the mating surfaces of the upper and lower portions together to cause the spline members on the upper and lower portions to be out of alignment with respect to each other when the handle is not engaged with the hub portion,
f. the spline member of the lower portion being effective to transmit said biasing force to the hub portion.

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**3,865,501**

**METHOD AND DEVICE FOR SOIL COMPACTING**

**Joris Kniep, Dubbeldam, Netherlands, assignor to International Technische Handelsonderneming en Adviesbureau "ITHA" N.V., Dubbeldam, Netherlands**

**Filed July 9, 1973, Ser. No. 377,587**
**Int. Cl. E01c *19/34***
**U.S. Cl. 404—133** **20 Claims**

**15.** A device for compacting the soil comprising: a tube having a source of vibrations rigidly secured to one extremity of said tube, said source being capable of generating longitudinally directed vibrations in said tube of at least two frequencies; a number of radial plates being rigidly connected near the opposite extremity of said tube, the dimensions of said plates being such that these plates are mainly reasonantly tuned to one of said two frequencies of said vibration source; means co-operating with said vibration source for changing the frequency of said vibration source to one of said two frequencies to cause said plates to vibrate substantially at their

resonant frequency and apply the energy output to effect soil compacting; a ballast-weight, and means for selectively applying said ballast-weight to said source of vibrations to increase the energy output of said radial plates.

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**3,865,502**
**TOOL EXTENSION**
**Fred H. Hamann, Minneapolis, Minn., assignor to The Raymond Lee Organization, Inc., New York, N.Y.**
**Filed Oct. 19, 1973, Ser. No. 407,975**
**Int. Cl. B23b** *51/00*
**U.S. Cl. 408—226** **1 Claim**

**1.** An extension for use with a driving unit having a chuck comprising:

a tool having a shank; a tool holder secured to the shank and having a second shank; first and second axially aligned elongated hollow tubes; each of said tubes having one end joined detachably together; a third shank having a portion adapted to be held in the chuck of the driving unit; said tool holder and said third shank having axially extending portions received within the other ends of said tubes; said tool holder and said third shank also having threaded means coaxial with said extending portions and extending therealong and overlying a portion of each of said other ends of said tubes; sleeve means having an internally tapering threaded portion; said sleeve means being received on the threaded means of said tool holder and said third shank to cooperate therewith to provide adjustable frictional engagement between said other ends of said tubes and said tool holder and said third shank, and thereby prevent undesirable rotation therebetween and provide a readily detachable connection.

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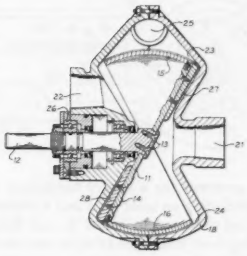
**3,865,503**
**WOBBLE PLATE PUMP**
**Walter S. Gearhart, State College, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Oct. 15, 1973, Ser. No. 406,767**
**Int. Cl. F01d** *23/00*
**U.S. Cl. 415—70** **4 Claims**



**1.** A wobble plate pump for transporting viscous liquids comprising,

a stationary housing having at least one inlet and at least one outlet,

a rotatable shaft extending axially into said stationary housing,

an impeller disc having front and rear parallel surfaces, said impeller disc being attached to said shaft with said surfaces being in planes inclined to the axis of said shaft, and first and second spherically shaped shrouds attached to said impeller disc for providing static and dynamic balance to said shaft and impeller disc.

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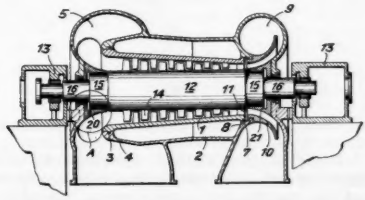
**3,865,504**
**AXIAL COMPRESSOR**
**Hans Benz, Winterthur, Switzerland, assignor to Brown Boveri-Sulzer Turbomachinery Ltd., Zurich, Switzerland**
**Filed Aug. 23, 1973, Ser. No. 390,896**
**Claims priority, application Switzerland, Sept. 8, 1972, 13194/72**
**Int. Cl. F04d** *29/08*
**U.S. Cl. 415—113** **8 Claims**



**1.** In an axial compressor

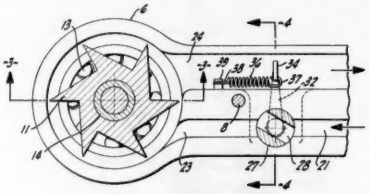
a casing,

a stator blade support radially centered within said casing; a bladed rotor rotatably mounted within said casing and stator blade support;

a structural part at least radially adjustably mounted on said casing between said casing and said rotor; and

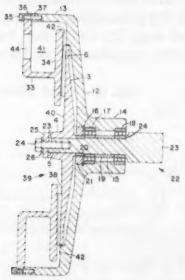
a labyrinth seal between said structural part and said rotor and means to center said structural part radially with respect to said rotor.

3,865,505
**SPEED GOVERNOR FOR A DENTAL HANDPIECE**
Lloyd P. Flatland, 1150 Alcoa Building, Kentfield, Calif. 94111
Filed Aug. 6, 1973, Ser. No. 386,174
Int. Cl. F01b 25/02
U.S. Cl. 415—149 3 Claims



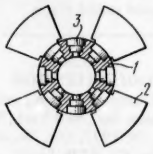
1. A speed governor for a dental handpiece comprising a head housing including an inlet duct and a discharge duct, an air turbine wheel mounted to rotate in said head housing, a handle extending from said head housing, means for supplying air through said handle and said inlet duct to the inlet side of said turbine wheel, means for releasing directly to the atmosphere air from said head housing in the vicinity of said turbine wheel, means for releasing air through said discharge duct and said handle from the discharge side of said turbine wheel, a valve in said inlet duct, means movable in position in response to released air flowing out through said discharge duct, and means in said head housing for connecting said movable means to control said valve.

3,865,506
**CENTRIFUGAL COMPRESSOR**
C. Richard Gerlach, San Antonio, Tex., assignor to Micro-Gen Equipment Corporation, San Antonio, Tex.
Filed July 9, 1973, Ser. No. 377,567
Int. Cl. F04d 7/02
U.S. Cl. 415—213 R 5 Claims



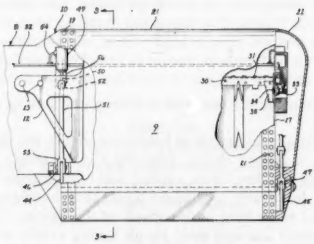
1. A centrifugal air compressor comprising a housing enclosing an impeller, an air inlet in said housing to the air inlet zone of said impeller, said impeller having a plurality of circumferentially arranged air foil vanes extending outwardly from said air inlet zone at an angle to the impeller radius and opposite the direction of rotation, said air foil vanes gradually increase in circumferentially width from the inlet tip to beyond their mid length and then decrease in circumferentially width to the discharge tip, said air foil vanes have a free flat upper surface adjacent the housing, adjacent air foil vanes define an air flow channel therebetween, said channel gradually increasing in width from near the air intake end to the air discharge end, said width increasing linearly as a function of the channel length, said air inlet zone of said impeller being at the center portion thereof and said air foil vanes are substantially tangent to the outer circumference of said air inlet zone, the length of alternate air foil vanes is less than the adjacent air foil vane to define an air inlet pocket at the inlet to each pair of adjacent air flow channels.

3,865,507
**METHOD OF CONTROLLING THE EFFICIENCY OF BLADE HYDROMACHINES WITH CONSIDERABLE HEAD VARIATIONS**
Jury Abramovich Lesokhin, ulitsa Lensoveta, 32, kv. 75, and Anatoly Grigorievich Ivlev, Okhtinsky prospekt, 6/2, kv. 67, both of Leningrad, U.S.S.R.
Filed Dec. 29, 1972, Ser. No. 319,791
Claims priority, application U.S.S.R., Jan. 12, 1972, 1736683
Int. Cl. F01d 17/00
U.S. Cl. 416—1 5 Claims



1. A method of controlling the efficiency of a blade hydro machine having considerable water head variations at a hydro station, comprising: arranging on a runner whose parameters correspond to the maximum water head only some of the blades during its operation with a minimum head: arranging said blades symmetrically about the axis of said hydro machine; and increasing the number of the said blades as the head rises, said blades being also arranged symmetrically about the axis of said hydro machine.

3,865,508
**RAMJET POWERED ROTOR BLADE**
Bruno A. Nagler, Scottsdale, Ariz., assignor to Nagler Aircraft Corporation, Phoenix, Ariz.
Filed Oct. 19, 1972, Ser. No. 299,074
Int. Cl. B64c 27/18
U.S. Cl. 416—22 11 Claims



1. A ramjet disposed at the extremity of a rotor blade, said ramjet including fuel nozzles, an igniter, flame arrestors, and a combustion chamber, said ramjet comprising in combination:

a first rectangular slot disposed at the leading edge of the rotor blade, said first slot defining the intake port for said ramjet;

a second rectangular slot disposed at a point rearward of and in lateral alignment with said first slot in said rotor blade, said second slot defining the exhaust port for said ramjet;

an airfoil shaped envelope, including upper and lower skins, extending from said first slot to said second slot, said envelope enclosing the fuel nozzles, igniters and flame arrestors for said ramjet, said envelope being essentially devoid of any protrusions to disrupt the lift generating capability of the extremity of said rotor blade and defining a space of rectangular vertical cross-section;

a positionable vane pivotable with respect to said envelope in proximity to said exhaust port to open and close said exhaust port; and

means for selectively pivoting said vane downwardly to a first position to increase the lift generating capability of the extremity of the rotor blade while simultaneously opening said exhaust port and pivoting said vane upwardly to a second position in alignment with the airfoil shape of said envelope to reduce the drag of the extremity of the rotor blade while simultaneously closing said exhaust port; whereby, said vane is positioned in said first position to increase the lift of the rotor blade while said ramjet is developing thrust and said vane is positioned in said second position to reduce the drag of the extremity of the rotor blade while said ramjet is not developing thrust.

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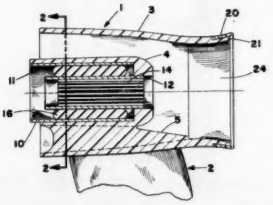
**3,865,509**

## PROPELLER CONSTRUCTION

**Michael E. Frazzell, Neenah, and Richard H. Snyder, Oshkosh, both of Wis., assignors to Brunswick Corp., Skokie, Ill.**

**Filed Aug. 2, 1973, Ser. No. 385,170**
**Int. Cl. B63h** *1/28*
**U.S. Cl. 416—93** **11 Claims**



**1.** A through-the-hub exhaust type marine propeller comprising a hub and blades integrally molded of nylon reinforced by greater than thirty percent by weight of fiberglass, said hub including an outer cylindrical housing, an inner hub portion and a plurality of webs supporting said inner portion within said housing.

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**3,865,510**

## MARINE PROPELLER

**Takao Yoshino, Tokyo, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

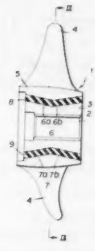
**Filed Nov. 21, 1973, Ser. No. 418,023**
**Claims priority, application Japan, Nov. 29, 1972, 47-118888**
**Int. Cl. B63h** *1/14*
**U.S. Cl. 416—134** **6 Claims**

**1.** A marine propeller comprising

a. an inner cylinder having an engaging hole in the center thereof for engaging a drive shaft, the outer surface of said inner cylinder having a circumferential trough formed therein;

b. a hollow outer cylinder having a plurality of blades projecting from the outer periphery thereof, the inner surface of said outer cylinder having a circumferential crest formed thereon, said crest corresponding to said trough, said inner and outer cylinders being aligned coaxially and spaced apart such that a gap is formed between said inner and outer cylinders and there is no direct contact between said inner and outer cylinders along the coaxially aligned surfaces; and

c. resilient means disposed in said gap, said resilient means contacting said inner and outer cylinders along the total length of said gap, said resilient means absorbing the shock generated by said propellers and operably engaging said crest and trough to prevent the separation of said inner and outer cylinders.



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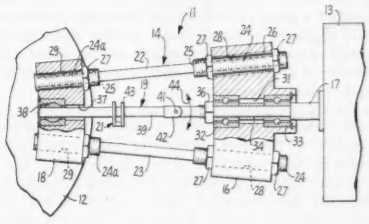
**3,865,511**

## ROTOR BLADE AND HUB ATTACHMENT AND CONTROL

**Gerald L. Breuner, 50 Melody Ln., Orinda, Calif. 94563**

**Filed Feb. 8, 1974, Ser. No. 440,852**
**Int. Cl. B64c** *27/38*
**U.S. Cl. 416—141** **9 Claims**



**1.** In a rotating wing aircraft having rotor blades carried about a central rotor hub an improved attachment and control means for said blades and hub comprising,

a. a pair of cable means attached to said hub and extending radially outward from the hub toward the inner end of a blade,

b. a first fixture means secured to the outer ends of the pair of cable means,

c. a blade spar rotatably journaled in said first fixture means and extending radially therefrom to support the inner end of the blade,

d. a second fixture means attached to the central rotor hub for supporting and carrying the inner end of the pair of cable means,

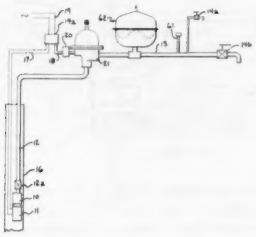
e. a pitch control means coupled to said rotatable spar, and

f. means for rotating the pitch control means to selectively change the pitch of the blade.

**3,865,512**
## CONTROL APPARATUS FOR A WATER SUPPLY SYSTEM

**Elmer M. Deters, Muscatine, Iowa, assignor to Weil-McLain Co., Inc., Dallas, Tex.**

**Filed Nov. 19, 1973, Ser. No. 416,957**
**Int. Cl. F04b *49/00***
**U.S. Cl. 417—26** **5 Claims**



**1.** A control apparatus for a water system of the type having a motor operated pump for pumping water through a delivery line to one or more valved outlets, said control apparatus being adapted to control starting and stopping of the pump motor and to maintain the pressure on the water supplied to the delivery line in a narrow regulated pressure range as the flow from the delivery line varies over a wide flow range between a low bypass rate and full pump delivery rate at said regulated pressure range, said control apparatus comprising,

a. a valve body having an annular inwardly facing valve seat, an inlet chamber at one side of the seat adapted for connection to a pump and an outlet chamber at the other side of the seat adapted for connection to a delivery line of a water system,

b. pressure operated motor control switch means responsive to the pressure at said outlet chamber for engergizing the pump motor when the pressure at the outlet chamber reaches a preset lower switch operating pressure below said regulated pressure range and for deenergizing the pump motor when the pressure at the outlet chamber reaches a preset upper switch operating pressure above said regulated pressure range,

c. a diaphragm peripherally attached to said valve body at said outlet chamber side of the seat and having one side exposed to the fluid pressure at said outlet chamber, a valve member attached to said diaphragm at the outlet chamber side of the seat and extending through said seat into the inlet chamber, valve biasing means yieldably urging said diaphragm toward said seat and against the force of the fluid pressure acting on said one side of the diaphragm to move the valve member to a first axial position when the pressure in the outlet chamber is below said regulated pressure range, said diaphragm being operative in response to the pressure in said outlet chamber to move said valve member from said first axial position to a second axial position when the pressure in the outlet chamber increases to the upper limit of said regulated pressure range and to move said valve member to a third axial position when the pressure in the outlet chamber increases to a value above said regulated pressure range and below said upper switch operating pressure.

d. said valve member having a reduced diameter stem portion and an enlarged flow regulating portion and a flow limiting portion at different axial locations therealong such that the stem portion is located at the seat in said first axial position of the valve member, said flow regulating portion is located at the seat in said second axial position of the valve member, and said flow limiting portion is located at the seat in said third axial position of the valve member, said stem portion having a cross-sectional area that is small as compared to the seat to allow relatively unrestricted flow therethrough; said flow regulating portion having a cross-sectional area to substantially span the seat and restrict flow therethrough to said low bypass rate, and said flow limiting portion having a cross-sectional area intermediate that of the stem portion and the flow regulating portion to increase flow through the seat above said low bypass rate when the pressure in the outlet chamber rises above said regulated pressure range and more rapidly build up pressure at the outlet chamber side of the valve seat to said upper switch operating pressure.

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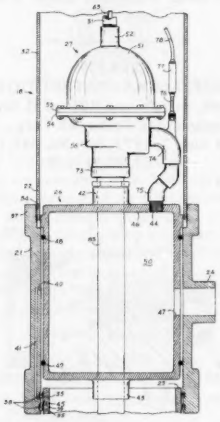
**3,865,513**
## PITLESS WATER SYSTEM

**Thomas B. Clark, 2338 Elm St., Davenport, Iowa 52803**

**Filed Oct. 19, 1973, Ser. No. 407,924**
**Int. Cl. F04b *49/00***
**U.S. Cl. 417—38** **5 Claims**



**1.** An apparatus for transmitting fluid such as water from a pump in a well casing upwardly through the drop pipe of the pump to a demand outlet comprising:

shell means including a hollow shell open at the top and bottom and of sufficient length such that a lower portion thereof would be below the frost line of a given geographical area and the upper portion thereof would be above the ground level for accessibility to the interior thereof, said hollow shell having a diameter no greater than the diameter of the well casing;

casting means including a casting threadably connected at the upper end thereof to the lower end of said shell and the upper end of the well casing, said casting having an outlet formed therein for fluid connection to the demand outlet;

spool means including a spool unit having an enclosed water chamber, said spool unit located within and adjacent to the inside wall of said casting, said spool unit having sealing members between said spool unit and said casting to prevent fluid flow therebetween, said spool unit having aligned openings formed in the top and the bottom thereof to receive the drop pipe therethrough, and said spool unit having an outlet registered with and fluid connected to said casting means outlet and further having an inlet formed in the top wall) thereof;

valve means for delivering water under constant pressure at any given flow, said valve means having a valve inlet and a valve outlet, said valve inlet fluid connected in a sealed manner to the drop pipe near to the top of said spool unit,

said valve outlet fluid connected to said inlet of said spool unit; and

pressure responsive means for operating the pump in response to a predetermined demand of the water from said valve means located at the upper end of said shell and fluid connected to and intermediate of said valve outlet and said inlet of said spool unit and to the pump.

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**3,865,514**

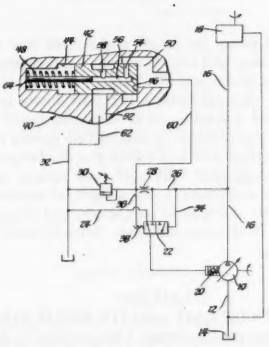
**POWER TRANSMISSION**

**Kurt R. Lonnemo, Troy, Mich., assignor to Sperry Rand Corp., Troy, Mich.**

**Filed July 25, 1973, Ser. No. 382,427**

**Int. Cl. F04b** *49/00*

**U.S. Cl. 417—212** **5 Claims**



**1.** In a control system for a pressure compensated variable displacement hydraulic pump of the type having a spring biased, displacement reducing, servo motor operated by a three-way pilot valve connected to the pump outlet and to exhaust and having a control circuit including a restrictor and a relief valve in series between the pump outlet and the exhaust to carry a continuous bleed flow with the pilot valve responsive to the pressure drop through the restrictor, that improvement which includes a two-way start-up valve in parallel with the relief valve and biased to open position when not subjected to inlet pressure, the position of the start-up valve controlling the pressure on the downstream side of the restrictor, which in turn positions the three-way pilot valve and hydraulic damping means for restricting the rate of closing of the start-up valve when subjected to inlet pressure.

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**3,865,515**

**SELF ADJUSTING TANGENCY-CLEARANCE COMPRESSOR WITH LIQUID PURGE CAPABILITY**

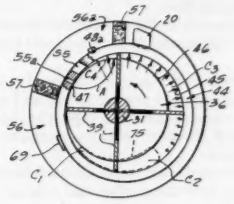
**Clifford H. Allen, Chesterland, Ohio, assignor to TRW Inc., Cleveland, Ohio**

**Filed Dec. 5, 1973, Ser. No. 421,988**

**Int. Cl. F01c** *19/00, 21/04;* **F04b** *49/00*

**U.S. Cl. 417—283** **26 Claims**

**1.** In a tangency seal fluid pressure device of the type having a housing with a fluid inlet and outlet, a rotor rotatably mounted in the housing and means projecting from the rotor acting on fluid between the inlet and outlet, the improvement of a free swinging member in said housing eccentrically enveloping said rotor, guiding said means projecting from the rotor and pressed against the rotor along a line of tangency between the member and rotor by pressures between the rotor and



member, said inlet and outlet communicating with the interior of the member on opposite sides of the tangency line.

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**3,865,516**

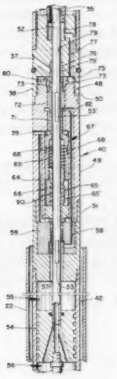
**FLUID ACTUATED DOWN-HOLE PUMP**

**George K. Roeder, Box 4335, Odessa, Tex. 79760**

**Filed Aug. 3, 1973, Ser. No. 385,459**

**Int. Cl. F04b** *17/00*

**U.S. Cl. 417—403** **6 Claims**



**1.** A fluid actuated pump assembly having a valve assembly, a power fluid chamber, an engine, and a production pump, a formation fluid inlet flow means and a produced fluid flow means flow attached to said pump; means by which a source of power fluid can be flow connected to the power fluid chamber of the valve assembly; and a spent power fluid outlet; the improvement comprising:

said engine having a piston reciprocatingly received within an engine cylinder, said piston dividing said engine cylinder into an upper cylinder chamber and a lower cylinder chamber; a valve control rod having an axial flow passageway formed therethrough, said control rod being connected to said piston and extending through the valve assembly for controlling the action of the valve assembly which in turn controls the fluid flow path to said engine; a seal tube supported by said valve assembly and spaced from said control rod, said control rod being received within said seal tube; seal means reciprocatingly receiving said control rod therethrough for preventing power fluid flow from the power fluid chamber, along the exterior surface of the rod, and into said seal tube; a connecting rod connected between said piston and the production pump for actuating the production pump;

means forming a first flow passageway from the valve assembly to said upper cylinder chamber, means forming a second flow passageway from the valve assembly to the interior of said seal tube, and into the interior of said

hollow valve control rod, through said piston, and into said lower cylinder chamber; means forming an exhaust flow passageway through which spent power fluid from the engine can flow;

said valve assembly includes a control sleeve axially aligned with and reciprocatingly receiving said control rod therethrough;

a valve element concentrically arranged respective to said control rod and said control sleeve and movable from a first to a second position, a marginal length of said control sleeve being received within a marginal length of said valve element;

spaced shoulders on said valve element forming a traveling annulus for flow connecting said exhaust passageway to said second passageway when said valve element is in the first position, and for flow connecting said exhaust passageway to said first passageway when said valve element is in the second position;

a spiral groove formed on a marginal longitudinal interior surface of said valve element which slidably contacts said marginal exterior surface of said control sleeve to provide for a bleed passageway through which power fluid can flow;

so that said valve assembly connects said first flow passageway to said exhaust flow passageway for conducting spent power fluid away from said upper chamber; and to conduct power fluid flow to said second flow passageway in order to cause said piston to reciprocate in a first direction; and, said valve assembly connects said first flow passageway to conduct power fluid flow to said upper chamber and to conduct spent power fluid flow away from said second flow passageway in order to cause said piston to reciprocate in a second direction.

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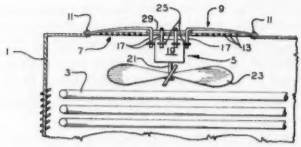
## 3,865,517
## REFRIGERATION CONDENSER UNIT

Walter H. Simmons, Marietta, N.Y., and Saleh H. Almilli, Waco, Tex., assignors to Carrier Corp., Syracuse, N.Y.

Filed May 29, 1973, Ser. No. 364,566
Int. Cl. F25b *39/04*
U.S. Cl. 417—424 1 Claim



1. A refrigeration condenser unit comprising:

a housing having a horizontal, top wall;

an opening in the horizontal, top wall for passing air between the housing and the ambient surroundings;

an independent grille mounted on the housing over the opening, said grille including a plurality of motor support members extending through the opening and a protective motor cover extending partially across the opening;

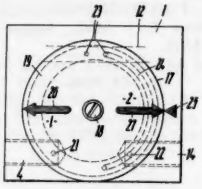
a fan disposed in the housing for moving air through the opening; and

a motor for rotating the fan, said motor being attached to the motor support members under the protective cover and having a rotatable shaft, the fan being attached to and rotatable by the shaft.

## 3,865,518
## FUEL-OIL PUMP FOR ONE AND TWO LINE OPERATION

Kyrre G. Sjotun, Kongsberg, Norway, assignor to Danfoss A/S, Nordborg, Denmark

Filed Feb. 26, 1971, Ser. No. 119,144
Claims priority, application Germany, Feb. 24, 1970, 2008510
Int. Cl. F04b *23/00, 39/00*
U.S. Cl. 417—440 3 Claims



1. A fuel oil pump for single and double line operation comprising a casing, said casing defining a return passage, said casing defining intake and discharge passages, said casing having a planar external surface, first port means in said surface having fluid communication with said return passage, second and third port means in said surface having respective fluid communication with said intake and discharge passages, valve means cooperable with said port means, said valve means having a first position providing fluid communication between said first and second port means and a second position providing fluid communication between said first and third port means.

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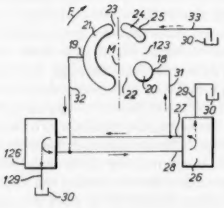
## 3,865,519
## HYDROSTATIC UNIT AND ITS APPLICATIONS

Pierre Andre Georges Lepelletier, Chatou, France, assignor to Societe Anonyme Francaise Du Ferodo, Paris, France

Filed Aug. 1, 1972, Ser. No. 277,113
Claims priority, application France, Aug. 11, 1971, 71.29305
Int. Cl. F01c *1/02*
U.S. Cl. 418—61 8 Claims



1. In the combination of a force feeder unit having a fluid conduit to supply liquid to said unit and a fluid conduit to remove liquid from said unit and a reservoir and means for supplying from said reservoir to said unit a quantity of liquid additional to the liquid from said one conduit, said unit comprising a fixed body having orifices connected with said conduits; the improvement comprising mobile means mounted in said fixed body and defining in said fixed body a series of chambers of variable volume adapted to transfer said liquid along a cyclic path having a first region in which said chambers increase in volume, and a second region in which said chambers decrease in volume, and distribution means disposed in said fixed body between said orifices on the one hand and said chambers on the other hand, said distribution means comprising means defining a first passage through which one

of said orifices communicates with said first region, and means defining a second passage through which another of said orifices communicates with said second region, said fixed body having a third orifice connected with said supplying means from said reservoir, said distribution means comprising means defining a third passage through which said third orifice communicates with at least said first region in which said chambers increase in volume.

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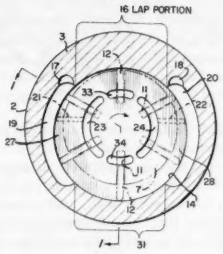
**3,865,520**
**ROTARY MOTOR WITH FLUID PRESSURE BIASED VANE**

**Leo Kramer, Skillman, N.J., and Harold E. Harris, Jr., Athens, Pa., assignors to Ingersoll-Rand Company, New York, N.Y.**

**Continuation of Ser. No. 178,623, Sept. 8, 1971, abandoned. This application June 1, 1973, Ser. No. 366,177**
**Int. Cl. F01c *21/00*; F03c *3/00***
**U.S. Cl. 418—82** **5 Claims**




1. A sliding vane fluid motor comprising:
a cylinder including an opposed pair of spaced end walls;
a rotor mounted to rotate in said cylinder between said end walls about an axis eccentric to the axis of said cylinder and having a series of vane slots extending longitudinally and outwardly toward the cylinder;
a vane sliding in each of said vane slots for engaging the cylinder as the rotor rotates;
a pair of angularly spaced kidney ports in one of the cylinder end walls located in spaced angular relationship about the axis of the rotor and communicating with the ends of the vane slots as the rotor rotates to supply fluid to and exhaust fluid from the vane slots; and
at least one closed pocket provided in each of said end walls in opposed relationship and angularly located about the rotor axis between and spaced from both of said ports, said pocket being effective to trap a volume of fluid under pressure for urging the vanes outwardly as the vane slots travel past said pocket.

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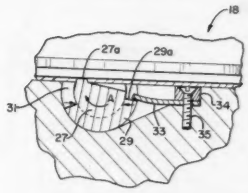
**3,865,521**
**SEAL ASSEMBLY FOR ROTARY ENGINES**

**Lewis E. Upchurch, 31 Reservoir Ave., Revere, Mass. 02151**

**Filed July 30, 1973, Ser. No. 383,675**
**Int. Cl. F01c *19/02*; F03c *3/00***
**U.S. Cl. 418—121** **8 Claims**

1. A seal assembly, for sealing a first engine member to a second engine member while permitting relative sliding between the members, comprising: a groove and a recess communicating with said groove in said first member; a strip of seal material disposed in said groove, said groove and said strip having the cross-sectional shape of a segment of a cylinder and having common axes, said strip having a collar disposed in said recess and limiting axial travel of the strip, and said strip being rotatable about its axis in said groove and having a sealing face disposed to one side of its axis and engaging said second member; and a spring secured to said first member and bearing on said collar on the other side of the



strip axis and urging said face into engagement with said second member.

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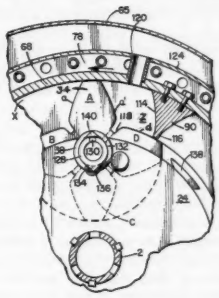
**3,865,522**
**ROTARY STEAM ENGINE**

**Anthony Nardi, Burlington, Mass., assignor to Clean Energy, Inc., Newton Highlands, Mass.**

**Filed Aug. 30, 1973, Ser. No. 392,948**
**Int. Cl. F01c *1/00***
**U.S. Cl. 418—161** **6 Claims**

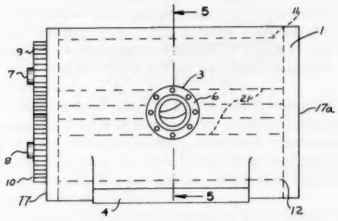


1. In a rotary steam engine having a stationary discontinuous cylindrical inner wall and rotating outer and side walls to form a curved cylinder, a piston attached to the rotating walls and a four bladed rotatable element associated with the inner wall, one of said blades extending across and blocking said cylinder, means for causing rotation of said rotatable element through 90° whereby said piston may pass thereby, said means comprising curved faces on the blades of said rotatable elements of the same radius as said inner walls, curved faces on said piston having a radius greater than the radius of said inner wall, the inner end of said piston comprising a gear tooth, cooperating gear tooth faces at the root areas between adjacent blades of said rotating element, and an exhaust port through said outer wall located in advance of its related piston a distance such that when said exhaust port has moved beyond said blocking blade, said piston will have started its travel over the curved face of the next adjacent blade and a sealed chamber between said piston and blocking blade will be created, said curved faces of said piston and blocking blade arranged to engage initially along a line toward the outer end of said blocking blade to cause rotation of said element with the line of engagement between said piston and blocking blade moving inwardly as rotation of said blocking blade continues, said gear tooth and gear tooth faces then coming into operative engagement to continue the rotation of said element through said 90°.

## 3,865,523
## CONTINUOUS FLOW ROTARY PUMP

Samuel J. Baehr, La Prairie, Ill. 62346

Filed Mar. 16, 1973, Ser. No. 342,071
Int. Cl. F01c 1/16
U.S. Cl. 418—201 11 Claims



1. In a positive displacement rotary pump of the type designed for inducing continuous transfer of fluid material comprising, a pump casing having side and end walls, said casing having a pair of communicating and parallel cavities formed therein, said casing having an intake port and an outlet port provided upon its approximate opposite sides and opening into said cavities at the location of their communication within said casing, said casing being formed having channels provided upon its interior cavity surfaces, one of said channels being in communication with the intake port, and the other of said channel being in communication with the outlet port, said channels being elongated and arranged substantially in parallel with the length of said cavities, a pair of parallelly arranged and intermeshing rotor means, one of each rotor means disposed for close tolerance rotation within each of said cavities, said rotor means intermeshing at the vicinity of the communication between said casing cavities, each rotor means having a shaft extending axially from each of its ends, said shafts being bearing mounted within the end walls of said casing, one of said rotor means including a series of helical ribs formed upon its surface, the other of said rotor means including a series of helical flutes formed upon its surface, said rotor ribs and flutes being intermeshed, a plurality of said ribs and flutes being simultaneously in communication with either the elongated intake port and outlet port channels for providing pulse-free displacement of fluid materials and the continuous discharge of multiple quantities of said fluid material along the length of said rotor means, and at least one of said intermeshed ribs and flutes always being simultaneously in communication with both the intake and outlet channels during operation of said rotary pump.

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## 3,865,524
## ROTARY HYDRAULIC MOTOR

Tommy E. Stauth, Dodge City, Kans.

Continuation of Ser. No. 247,700, April 26, 1972, abandoned.
This application Oct. 31, 1973, Ser. No. 411,534
Int. Cl. F01c 1/18
U.S. Cl. 418—206 2 Claims

1. A rotary motor comprising:

a housing having a central body portion and opposite first and second side portions;

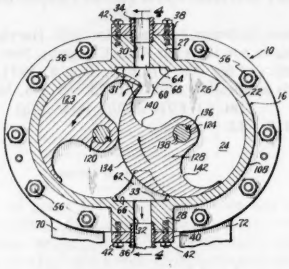
the central body portion being elongated and having a main rotor chamber formed therein defined by a rotor wall;

the central body portion having fluid inlet and outlet passages therein in diametrically opposed locations, said rotor wall having indentations therein about said inlet and outlet passages and extending axially between said first and second side portions;

a pair of axles, including an output axle and a timing axle, extending transversely across the main rotor chamber and journaled in bearing means formed in the first and second side portions;

a gear on each of said axles exterior of the second side portion, said gears being in mesh with one another;

a rotor on each axle, said rotors each being substantially semi-cylindrical in form and having a convex outer face contacting the wall of the rotor chamber during rotation, the rotors each including a central projecting hub with a transverse bore therein, and a pair of concave inner faces on each side of the hubs, the axles extending through said bores and the rotors being fixedly secured thereto and rotate in opposite directions such that the tip ends of respective rotors make sealing contact with each other



during rotation as do respective convex outer faces and central projecting hubs; and

well means comprising truncated triangular chambers formed in the side portions coincident in location with the indentations of the rotor wall, said truncated triangular chambers having their bases corresponding in dimension to said rotor wall indentations and wherein each of the said triangular truncated chambers terminates at a distance inwardly of the rotor wall just beyond the point where the tip ends of respective rotors make sealing contact with each other.

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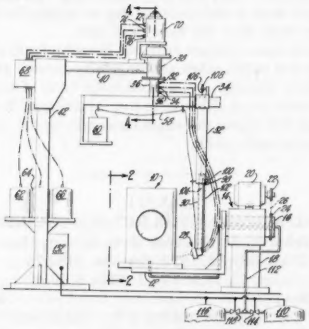
## 3,865,525
## APPARATUS FOR COATING THREE DIMENSIONAL OBJECTS

John William Dunn, Sylvania, Ohio, assignor to Owens-Corning Fiberglas Corp., Toledo, Ohio

Filed June 26, 1972, Ser. No. 266,191
Int. Cl. B05c 5/00, 7/02; B29c 13/00
U.S. Cl. 425—60 14 Claims



1. Apparatus for coating three dimensional surfaces of objects comprising: turret means constructed and arranged to provide a support for an object to be coated and for rotation of the centerline of the support in a plane passing through the longitudinal axis of an object to be coated thereon, a rotatable member positioned to one side of said support and supported for rotation about an axis generally lying in said plane, an extensible member supported on said rotatable member for

reciprocation generally parallel to said axis over the corresponding axial dimension of the object, material deposition means on said extensible member for coating the object, first drive means for rotating said rotatable member, second drive means for rotating said turret means, third drive means for reciprocating said extensible member by a distance corresponding to said axial dimension, and control means constructed and arranged to actuate said first drive means for 360° of rotation of said rotatable member while also actuating said third drive means to reciprocate said deposition means over one circumferentially extending area of the object, said control means thereafter actuating said second drive means to index said turret means to bring another area of the object in line with said axis, and said control means thereafter reactuating said first and third drive means to cause said deposition means to reciprocate over said other area of the object.

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**3,865,526**

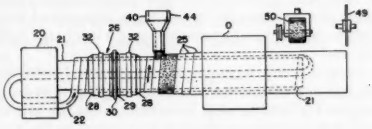
## APPARATUS FOR MANUFACTURING PIPES

**Frede Hilmar Drostholm, Vedbaek, Denmark, and Leonard S. Meyer, Columbia, S.C., assignors to Frede Hilmar Drostholm, Vedback, Denmark, by said Leonard Meyer**

**Division of Ser. No. 237,120, March 22, 1972, Pat. No. 3,784,667. This application June 18, 1973, Ser. No. 370,795**

**Int. Cl. B29d** *23/08*

**U.S. Cl. 425—140** **10 Claims**



1. Apparatus for use in making fiber reinforced resin pipe lengths having bell and spigot ends, comprising a mandrel having an axially movable surface, a bell forming mold element removably mounted on the moving mandrel surface to be advanced axially therewith, means for applying at least one layer of liquid fiber reinforced thermosetting resin material on the moving mandrel surface and on the mold element, and means for heating the applied thermosetting resin material to effect solidification thereof during axial advancement of the layer of fiber reinforced resin material and of the mold element.

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**3,865,527**

## TIRE CONDITIONING AND TRUING APPARATUS

**C. Bernie McGehee, 2212 Robin Hood, Albany, Ga. 31705; J. Samuel Rees, Rt. 1, Box 4, Preston, Ga. 31824, Luther J. Johnson, Jr., P.O. Box 56, Preston, Ga. 31824**

**Filed Aug. 25, 1972, Ser. No. 283,808**

**Int. Cl. B29h** *3/00, 21/00*

**U.S. Cl. 425—11** **7 Claims**

1. Tire conditioning apparatus comprising:

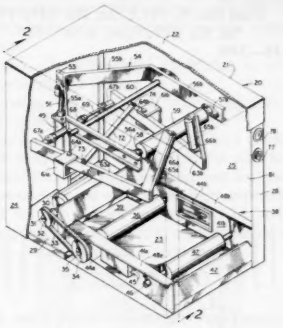
housing means defining an interior region dimensioned to receive a tire to be conditioned;

rotatable support roller means mounted in said housing means to rotatably support a tire received in said interior region;

motive means operably disposed in said housing means to impart rotation to a tire disposed on said support roller means;

pressure roller means disposed in said housing means to selectively apply force tending to resiliently deform a tire disposed on said support roller means; and

heater means positioned in said housing means to apply heat



directly to each of the sidewalls of a tire disposed on said support roller means.

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**3,865,528**

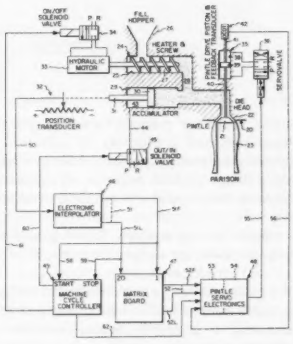
## EXTRUSION APPARATUS HAVING ELECTRONIC INTERPOLATOR

**Louis G. Roess, Aurora, N.Y., assignor to Moog Inc., East Aurora, N.Y.**

**Filed Nov. 1, 1973, Ser. No. 411,830**

**Int. Cl. B29d** *23/04*

**U.S. Cl. 425—145** **19 Claims**

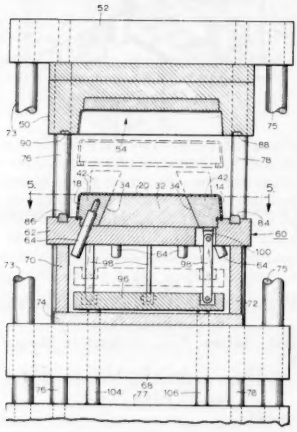


1. In cyclically operated extrusion apparatus including a die head and pintle movable relative to each other to provide a variable orifice, servocontroller means responsive to an electrical command signal for effecting relative movement between said die head and pintle and means for forcing extrudable material through said orifice to form a parison the wall thickness of which is determined by the size of said orifice, wherein the improvement comprises means providing said command signal including means providing a continuously variable electrical signal related to the parison forming sequence of each cycle of operation, electronic interpolator means to provide a plurality of interpolator output electrical signals responsive to different portions of the total range of said variable signal, programmable means for selecting portions of said interpolator output signals to provide programmed output signals and means for summing said programmed output signals to provide said command signal.

## 3,865,529
## MOLDING APPARATUS

Francesco Guzzo, Melrose Park, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Dec. 5, 1973, Ser. No. 421,779
Int. Cl. B29c *1/00*; B29f *1/00*
U.S. Cl. 425—249 6 Claims



1. An injection mold for manufacture of a plastic article having a bottom wall and a plurality of side wall portions forming a generally hollow polygonal enclosure with an inwardly extending flange portion adjacent an open top of said article thereby to constrict said top opening, said mold comprising:

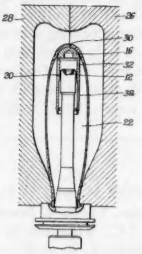
first mold means having a mold defining surface corresponding to the exterior surface dimensions of at least a portion of said article; and

second mold means having a mold defining surface corresponding to the interior surface dimensions of said article and comprising a generally frusto-pyramidal central member having a plurality of side wall portions of a predetermined slope and corresponding in number to said plurality of article side walls and having a plurality of corner wall portions located intermediate respective pairs of said central member side wall portions with said corner wall portions having a lesser slope than said side wall portions and further including side wall segments slidably movable along respective ones of each of said side wall portions, and corner wall segments slidably movable along respective ones of said corner wall portions, said side and corner wall segments each being movable from respective mold defining positions in which said segments cooperate with said central member to form said mold defining surface of said second mold means and a collapsed position in which said side and corner wall segments are displaced relative to said central member so that said second mold means is suffficiently reduced in size to permit it to be withdrawn from the constricted top opening of said plastic article.

## 3,865,530
## PRESSURE CONTROL DURING BLOW-MOULDING

Jesselallee, 21 e, 2 Hamburg 73, 21 E, and Karl-Heinrich Seifert, Hauke-Haien-Weg 15, 2 Hamburg, 73, 15, Germany

Filed July 26, 1972, Ser. No. 275,141
Claims priority, application Germany, Aug. 18, 1971, 2141429
Int. Cl. B29d *23/03*
U.S. Cl. 425—387 B 4 Claims



1. A blow mould apparatus comprising:

a blow mould;

a mandrel for receiving an open-ended parison, said mandrel having a longitudinal axis and being formed with an outside surface;

means in said mandrel defining a longitudinally extending passage therethrough for passing a pressurized medium, said mandrel passage terminating in a discharge orifice at the end thereof;

an elongated cup member slidably disposed over the discharge end of said mandrel, said cup member being arranged for slidable axial movement along the axis of said mandrel and relative thereof in response to the pressure of a pressurized medium discharged from the mandrel against the closed end of said cup member to substantially elongate the parison in said mould;

said outside surface of said mandrel and the internal surface of said cup member being spaced from each other to define an orifice means which is variable as said cup member is moved relative to said mandrel along the longitudinal axis of said mandrel in response to the pressure of the pressurized medium so that discharge occurs and the orifice moves along the length of said cup member to variably throttle the pressurized medium discharged from said mandrel.

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## 3,865,531
## BLOW MOLDS FOR MAKING CONTAINERS HAVING RECESSED BOTTOMS

Lawrence A. Moore, Rockford, Ill., and Donald R. Welty, Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Mar. 16, 1973, Ser. No. 342,042
Int. Cl. B29d *23/03*
U.S. Cl. 425—387 B 11 Claims

1. A blow molding apparatus for forming a container having an inwardly recessed end, comprising:

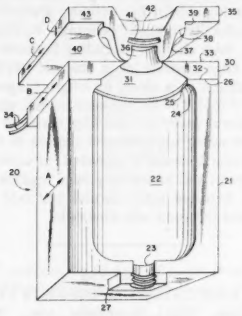
a blow mold having a cavity tubular in shape with an inwardly concave end,

means for expanding a parison within such cavity into said shape thereof having a tubular portion and an outwardly convex end,

means for establishing a temperature differential between the convex end and the tubular portion of the blown article to maintain the convex end heated and soft while the tubular portion is maintained sufficiently cooled to have at least some degree of rigidity,

and means for moving at least a part of the said inwardly concave end of the blow mold into the tubular portion

thereof during the existence of the temperature differential to move the outwardly convex end of the blown article into the tubular portion thereof to reverse the curvature of said end to form an essentially outwardly concave end on the blown article.



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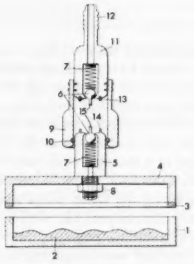
## 3,865,532
## APPARATUS FOR EXPANDING THERMOPLASTIC FOOD IN A VACUUM

**Sankichi Sakuma, Fujishiro, Japan, assignor to Takasago & Perfumery Co. Ltd., Tokyo, Japan**

**Continuation of Ser. No. 125,492, March 18, 1971, abandoned. This application Mar. 22, 1973, Ser. No. 344,047**
**Claims priority, application Japan, Mar. 31, 1970, 45-30140**
**Int. Cl. A23g** *1/22*
**U.S. Cl. 425—405 R** **1 Claim**



**1.** Apparatus for expanding thermoplastic food in a vacuum comprising:
a thermoplastic food mold,
a cover therefor,
said cover having a first sealing ring at the periphery thereof,
a first hollow cylindrical cylinder which passes through said cover and communicates with said thermoplastic food mold,
said first hollow cylindrical cylinder having a first cavity,
a first spring and a first sphere disposed within said first cavity so as to bias said first sphere to close a first opening in said first cavity,
said first sphere having a first projection thereon which extends beyond said first cavity when said first sphere is biased to close said first opening,
a second hollow cylindrical cylinder which is adapted for connection to a vacuum source,
said second hollow cylindrical cylinder having a second cavity,
a second spring and a second sphere disposed within said second cavity so as to bias said second sphere to close a second opening in said second cavity,
said second sphere having a second projection thereon which extends beyond said second cavity when said second sphere is biased to close said second opening,
a guide ring,
means rigidly connecting said guide ring to said second hollow cylindrical cylinder,
a second sealing ring for slidably connecting said guide ring to said first hollow cylindrical cylinder,
whereby movement of said guide ring with respect to said first hollow cylindrical cylinder causes said first projection of said first sphere to push against said second projection of said second sphere causing compression of said first and second springs and opening of said first and second cavities to permit the connection of a vacuum source to said thermoplastic food mold.

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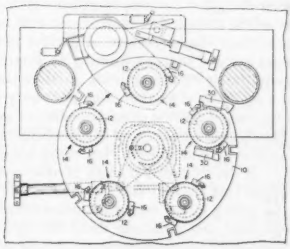
## 3,865,533
## MEANS FOR SECURING AND REMOVING MOLDS FROM COMPACTING APPARATUS

**Thomas A. Deprez, and Frank M. Whalley, both of Rochester, N.Y., assignors to The Gleason Works, Rochester, N.Y.**

**Filed May 15, 1974, Ser. No. 469,979**
**Int. Cl. B30b** *5/02, 11/00*
**U.S. Cl. 425—405 H** **10 Claims**



**1.** In powder compacting apparatus of the type which includes a supporting means having a plurality of openings formed therethrough for receiving and supporting a plurality of mold assemblies which contain compacted parts after they have been formed from a powder material, the improvement in means for securing and removing said mold assemblies from said supporting means, comprising:
latching means mounted on said supporting means for securing said mold assemblies in their respective positions relative to said openings formed in the supporting means, said latching means being releasable from securing positions relative to said mold assemblies so that the mold assembly can be lifted and removed from the supporting means when the latching means are released.

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## 3,865,534
## DEVICE FOR CLAMPING A MOLD FRAME USED FOR CENTRIFUGAL COMPACTION OF CONCRETE

**Takemitsu Mori, Tokyo, Japan, assignor to Nippon Concrete Industries Co. Ltd., Tokyo, Japan**

**Division of Ser. No. 258,355, May 31, 1972, abandoned. This application Dec. 11, 1973, Ser. No. 423,769**
**Claims priority, application Japan, Jan. 26, 1972, 47-10449**
**Int. Cl. B28b** *21/80;* **B22d** *13/10*
**U.S. Cl. 425—451.7** **4 Claims**

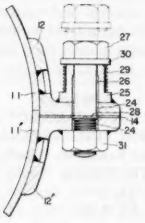
**1.** In a device for clamping a mold frame used for the centrifugal compaction of concrete which is characterized by angle-shaped flanges having one arm thereof fixedly secured

to respective ones of a pair of long shell steel plates of semicircular section which are positioned together to form a cylindrical frame, said angle-shaped flanges having concentric bolt penetrating holes formed in the other arms thereof, the improvement comprising:

a bolt for insertion through said concentric holes from one side of the other arm of one of said flanges;

a nut for positioning on the opposite side of the other arm of the other of said flanges for internally receiving said bolt in threaded engagement therewith;

means for retaining said nut in abutting relation with said opposite side of said other arm of said other of said flanges and for preventing accidental removal thereof;




a retaining metal fitting guide means concentrically connected about the hole in said one of said flanges and having an elongated opening therethrough for permitting passage of the threaded portion of said bolt, said opening having a lower staged portion of greater diameter than the upper portion thereby forming an internal shoulder within said retaining metal fitting guide means; and

a stopper ring secured to the outer periphery of said bolt within the staged portion of said opening of said retaining metal fitting guide means and being slidable therewithin, the diameter of said stopper ring being greater than the diameter of the threaded portion of said bolt, such that said stopper ring engages said shoulder within said retaining metal fitting guide means for preventing removal of said bolt from said retaining metal fitting guide means upon threadedly disengaging said bolt and said nut.

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**3,865,535**

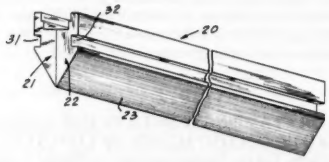
**TWO PIECE DIE ASSEMBLY FOR EXTRUDING MICRO-ILAMENTS**

**Roy A. Langdon, and Wilfried R. Gerschon, both of Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.**

**Filed June 4, 1973, Ser. No. 366,557**

**Int. Cl. B29f** *3/04*

**U.S. Cl. 425—464** **8 Claims**




1. A die adapted for the simultaneous extrusion of a plurality of longitudinally aligned filaments, said die comprising:

A. a pair of mating sections, each section being formed of metal, said sections defining together in an assembled configuration a longitudinally elongated assembly,

B. said assembly defining exteriorly a pair of opposed, tapered die faces, one on each of said halves, said faces mating to define an angular edge portion,

C. said assembly further defining therewithin a centrally disposed, longitudinally elongated chamber rearwardly opening, forwardly laterally tapered in said assembly, a portion of said chamber being in each of said sections,

D. said assembly still further defining therewithin a plurality of longitudinally spaced, generally vertically extending channels, each channel extending between said chamber and said edge portion, each channel having an average cross sectional area along its length ranging from about $6.4 \times 10^{-5}$ to $4.8 \times 10^{-4}$ square inches, and

E. a peripheral layer of bonding material between said sections bonding together said section in said assembled configuration located in opposed, abutting side regions therebetween and in abutting edge regions therebetween vertically between said channel and said forward edge portion and between said channels.

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**3,865,536**

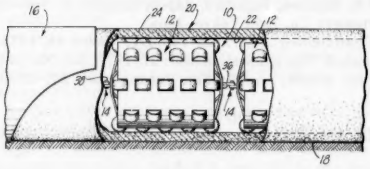
**TRAVELING INTERNAL CONDUIT SUPPORT**

**B. Neil Johnson, 10811 Newcombe Ave., Whittier, Calif. 90605, and Robert A. Midthun, 1404 Tustin, Santa Ana, Calif. 92700**

**Continuation of Ser. No. 248,649, April 28, 1972, abandoned. This application Apr. 18, 1974, Ser. No. 462,085**

**Int. Cl. B28b** *17/00, 21/00*

**U.S. Cl. 425—472** **12 Claims**




1. A traveling internal support for a conduit comprising:

at least one carriage having a longitudinal axis and movable in a direction of said axis through the interior passage of said conduit, said carriage including a frame conduit wall engaging rollers rotatable on fixed axes transverse to said carriage axis and spaced about the full circumference of said carriage in a manner such that rollers are located at the bottom, sides, and top of said carriage for engaging and rolling along the floor, sides and top of the conduit wall to internally support the wall as the carriage travels through said conduit passage, and said rollers having peripheral conduit wall engaging surfaces of substantial width compared to the roller radius.

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**3,865,537**

**MOISTURE INDICATOR FOR PHOTOFLASH LAMP**

**Howard S. Painter, Linden, and Donald E. Armstrong, Williamsport, all of Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.**

**Filed Mar. 6, 1974, Ser. No. 448,647**

**Int. Cl. F23d** *5/12*

**U.S. Cl. 431—13** **16 Claims**

1. A photoflash lamp comprising:

an hermetically sealed, light-transmitting envelope;

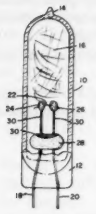
a quantity of filamentary combustible material located within said envelope;

a combustion-supporting gas in said envelope;

ignition means attached to said envelope and disposed in operative relationship to said combustible material; and

a moisture indicator comprising a quantity of dried paste disposed in said envelope to indicate by a change in coloration the presence of air therein, said dried paste

comprising a mixture of cobaltous cobalticyanide, a colloidal magnesium silicate, and between about 0.5 percent



to about 2 percent by weight of a water soluble organic polymer of the hydrogen bonding type.

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**3,865,538**

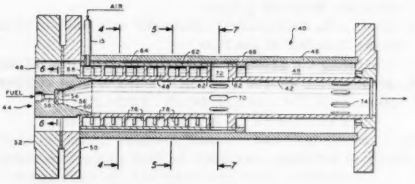
**COMBUSTOR AND COMBUSTION APPARATUS**

**Harold T. Quigg, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 238,318, March 27, 1972, Pat. No. 3,826,078, which is a continuation-in-part of Ser. No. 208,245, Dec. 15, 1971, abandoned. This application Apr. 11, 1974, Ser. No. 459,956**

**Int. Cl. F23d** *11/44*

**U.S. Cl. 431—215** **13 Claims**



**1.** An apparatus for producing and utilizing heat energy, comprising, in combination:

an air supply conduit;

a combustion means for burning a fuel to produce hot combustion gases containing heat energy, said combustion means comprising a primary combustion region, a secondary combustion region located downstream from said primary combustion region, and a quench or dilution region located downstream from said secondary combustion region;

a fuel inlet means for introducing a fuel into said primary combustion region;

a primary air conduit means connected to said air supply conduit and said combustion means at said primary combustion region for introducing a stream of air compressing primary air into said primary combustion region;

a secondary air conduit means connected to said air supply conduit and said combustion means at said secondary combustion region for introducing a stream of air comprising secondary air into said secondary combustion region;

a heat exchange means;

a quench air conduit means connected to said air supply conduit, said heat exchange means, and said combustion means at said secondary combustion region and said quench region for delivering a stream of air from said air supply conduit, through said heat exchange means, and introducing heated air into at least one of said secondary combustion region and said quench or dilution region of said combustion means;

a heat energy utilization means for utilizing a portion of said heat energy;

an effluent conduit means for passing hot combustion gases from said combustion means to said heat energy utilization means, and

an exhaust conduit means connecting said heat energy utilization means and said heat exchange means for passing exhaust hot combustion gases from said heat energy utilization means and into heat exchange with the air from said quench air conduit means and thereby utilize an additional portion of said heat energy.

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**3,865,539**

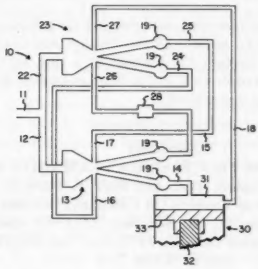
**PIEZOELECTRIC VOLTAGE GENERATOR**

**Harland L. Burge, Jr., Tarzana, and Richard J. Salvinski, Hacienda Heights, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Filed Sept. 4, 1973, Ser. No. 393,874**

**Int. Cl. F23q** *3/00;* **F02p** *3/12*

**U.S. Cl. 431—255** **4 Claims**



**1.** A combustion system of the type having a reactant injector, a source of a reactant at a high pressure, means for supplying the reactant to the injector and a spark ignition device in communication with the combustion zone, and comprising:

a housing;

a piston moveably mounted within said housing, said housing, and one end surface of said piston defining a first chamber therebetween;

a piezoelectric device mounted within said housing and positioned in engageable relationship with the other end surface of said piston for producing an electrical potential when subjected to mechanical stresses induced therein upon movement of said piston toward said device, said device including electrode terminals coupled to the combustion system ignition device; and

a fluidic oscillator coupled to said chamber and to the reactant source, the one surface area off said piston being greater than the area of engagement of the other surface with said piezoelectric device by a factor of at least ten whereby reactant, when supplied under pressure to said oscillator, is periodically introduced into and relieved from said chamber for actuating periodic movement of said piston and producing an alternating voltage across said terminals and to the ignition device.

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**3,865,540**

**PURGING SYSTEM AND METHOD FOR A PROCESS PRODUCING GLASS FIBER BLANKETS**

**Romain Eugene Loeffler, Defiance, Ohio, assignor to Johns Manville Corporation, Greenwood Village, Colo.**

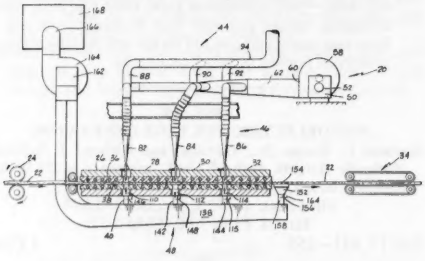
**Filed Apr. 27, 1973, Ser. No. 355,356**

**Int. Cl. C03c** *25/02*

**U.S. Cl. 432—2** **13 Claims**

**3.** In a method of curing and controlling the thickness of a binder impregnated fiber glass blanket by passing the blanket through a series of spaced-apart separate curing assemblies which progressively cure the blanket improvement comprising:

purging gaseous pollutants produced in the curing process by preventing the escape of gases from the blanket intermediate the curing assemblies to the surroundings and by drawing off said gases from the blanket as it passes intermediate said curing assemblies, removing the pollutants from the gases, and discharging the gases after the pollut-



ants have been removed, said purging including supplying air to one major surface of the blanket and drawing the air supplied through the blanket at a rate substantially equal to the supply rate as the blanket passes intermediate the curing assemblies.

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**3,865,541**

**METHOD FOR PROCESSING COLEMANITE ORE**

**David Wilson, Houston, Tex., and Blair T. Burwell, Denver, Colo., assignors to Tenneco Oil Company, Houston, Tex.**

**Continuation of Ser. No. 183,846, Sept. 27, 1971, abandoned. This application Oct. 23, 1973, Ser. No. 408,318**

**Int. Cl. F27b** *7/14*

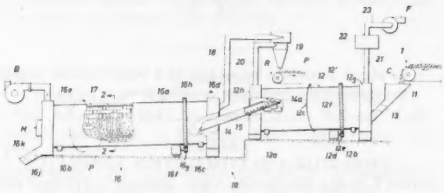
**U.S. Cl. 432—13** **1 Claim**

1. A method of processing ore containing a combination of decrepitatable colemanite and nondecrepitatable gangue whereby the colemanite and gangue are separated from each other comprising the steps of:

a. flowing a heated gas stream linearly upwardly through a treating area along a path which is inclined with respect to the horizontal whereby the gas travels from a lower point to a higher point;

b. introducing said ore into said treating area at said higher point;

c. repeatedly lifting and then dropping said ore while moving said ore through said gas countercurrent along a path



substantially non-parallel to the direction of flow of said gas until the colemanite in the ore is gradually heated to a temperature equal to or above the point of decrepitation and below the point of fusing or agglomeration of the colemanite whereby the colemanite decrepitates and separates from the gangue;

d. moving the decrepitated colemanite with said gas stream in the direction of gas flow;

e. separating the gas-moved colemanite from the gas; and

f. removing the gangue from the treating area at said lower point.

3,865,542

## HAIR DYEING COMPOSITIONS CONTAINING POLYHYDROXYLATED POLYETHER NONIONIC SURFACTANTS

**Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Montjay-la-Tour, both of France, assignors to L'Oreal, Paris, France**

**Continuation-in-part of Ser. No. 846,929, Aug. 1, 1969, Pat. No. 3,666,671, which is a continuation-in-part of Ser. No. 780,300, Nov. 29, 1968, Pat. No. 3,578,719, which is a continuation-in-part of Ser. No. 544,095, April 21, 1966, abandoned. This application Oct. 4, 1971, Ser. No. 186,524**

**Int. Cl. A61k** *7/12*

**U.S. Cl. 8—10.1** **7 Claims**

**1.** A composition for dyeing hair comprising an aqueous solution of a hair dye in amounts sufficient to color said hair and a compound having the formula

$$R_1O-[C_3H_5O(CH_2OH)]_n\,H$$

wherein the repeating group is linear, *n* has a statistical average value greater than 1 and equal to or less than 10, $R_1$ is selected from the group consisting of lipophilic alkyl, alkenyl and alkylaryl, having from 8 to 30 carbon atoms, said compound being present in amounts ranging from 1–60 percent by weight of said composition and said composition having a pH ranging from about 3–9.

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3,865,543

## PROCESS FOR DYEING OR PRINTING POLYAMIDE OR POLYURETHANE FIBRES WITH ANTHRAQUINONE-AZO DYESTUFFS

**Ludwig Schlafer, Sulzbach/Taunus, and Karl-Heinz Krell, Kelkheim/Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

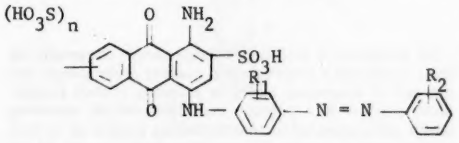
**Continuation of Ser. No. 18282, March 10, 1970,. This application Feb. 29, 1972, Ser. No. 230,473**

**Claims priority, application Germany, Mar. 20, 1969, 1914192**

**Int. Cl. C09b** *1/00*; **D06p** *1/20, 1/24, 3/24*

**U.S. Cl. 8—39** **3 Claims**

**1.** A process for coloration of synthetic polyamide fibers or polyurethane fibers which consists essentially of (a) dyeing said fibers in a dyebath at a temperature of about 60°C. to about 130°C. or (b) printing said fibers with a printing paste and thereafter steaming the printed fibers with steam at a pressure of about atmospheric to about 1 atmosphere gauge, said dyebath and printing paste having a pH between about 1 and about 8 and containing a water-soluble green to olive-green anthraquinone dyestuff of the formula



wherein $R_f$ is hydrogen, hydroxyl, lower alkyl, lower alkoxy, phenoxy, amino, acetylamino, benzoylamino, benzenesulfonylamino, chlorine or bromine, $R_2$ is hydrogen, lower alkyl, lower alkoxy, chlorine, bromine, carboxyl or sulfonic acid, and *n* is 0 or 1.

3,865,544

## DYEING WITH FOAM CONTROL COMPOSITION OF SILICA, POLYOXYPROPYLENES AND POLYDIMETHYLSILOXANE

**Joseph W. Keil, Midland, Mich., assignor to Dow Chemical Corporation, Midland, Mich.**

**Division of Ser. No. 253,617, May 15, 1972,. This application Sept. 17, 1973, Ser. No. 398,294**

**Int. Cl. D06p** *1/80*

**U.S. Cl. 8—93** **3 Claims**

**1.** In a textile dyeing process which includes the addition of a foam control agent to the system to control the foaming, the improvement comprising using a composition which consists essentially of

1. 70 to 98.9 percent by weight of a base oil selected from the group consisting of polyoxypropylene polymers and polyoxypropylene-polyoxyethylene copolymers having molecular weights in the range of 500 to 6,000, and siloxane glycol
2. 1 to 20 percent by weight of a foam control agent which consists essentially of 88 to 95 parts by weight of a liquid polydimethylsiloxane having a viscosity of at least 20 centistokes at 25°C., 5 to 10 parts by weight of silica, and 0 to 2 parts by weight of a siloxane resin consisting essentially of $SiO_2$ units and $(CH_3)_3SiO_{1/2}$ units the ratio of the $SiO_2$ units to the $(CH_3)_3SiO_{1/2}$ units being in the range of 1:0.4 to 1:1.2, and
3. 0.1 to 10 percent by weight of a dispersing agent which maintains (2) dispersed in (1) and which is a siloxane copolymer selected from the group consisting of
   i. copolymers consisting essentially of $SiO_2$ units, $(CH_3)_3SiO_{1/2}$ units and $Q(CH_3)_2SiO_{1/2}$ units wherein Q is a polyoxypropylene polymer or a polyoxypropylene-polyoxyethylene copolymer radical having a molecular weight in the range of 500 to 6,000, Q being attached to the silicon atom via a silicon-carbon bond, the ratio of the $SiO_2$ units to the total $(CH_3)_3SiO_{1/2}$ and $Q(CH_3)_2SiO_{1/2}$ units being in the range of 1:0.4 to 1:1.2, and
   ii. copolymers which are the reaction products derived from heating a mixture of a siloxane copolymer consisting essentially of $SiO_2$ units and $(CH_3)_3SiO_{1/2}$ units in which the ratio of the $SiO_2$ units to the $(CH_3)_3SiO_{1/2}$ units is in the range of 1:0.4 to 1:1.2, and a hydroxylated polyoxypropylene polymer or a hydroxylated polyoxypropylene-polyoxyethylene copolymer having molecular weights in the range of 500 to 6,000

as the foam control agent.

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3,865,545

## DURABLE PRESS METHOD

**John H. Forg, and George L. Payet, both of Cincinnati, Ohio, assignors to McGraw-Edison Company, Elgin, Ill.**

**Division of Ser. No. 179781, Sept. 13, 1971, Pat. No. 3,738,019. This application Dec. 12, 1972, Ser. No. 314,382**

**Int. Cl. D06m** *1/00*

**U.S. Cl. 8—116 R** **6 Claims**

**1.** In a method of treating cellulose-containing material to impart a durable press thereto: the steps of introducing moisture free of polymer-forming precondensates into said material by subjecting said material to steam and raising the temperature of the environment due to the steam, subjecting the material to formaldehyde and sulphur-dioxide vapor agents and to steam in an environment of a temperature higher than that of the material, subjecting the material to circulating air to remove moisture and said agents therefrom, and then heating the material to a temperature of the order of 250° F.

3,865,546

## DEPILATORY COMPOSITION AND METHOD OF USE

John C. Zemlin, Reading, and Katherine A. Bowler, Acton, both of Mass., assignors to Collaborative Research, Inc., Waltham, Mass.

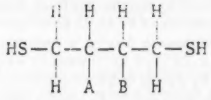
Continuation of Ser. No. 83,246, Oct. 22, 1970, abandoned, which is a continuation-in-part of Ser. No. 834,894, June 19, 1969, abandoned, which is a continuation-in-part of Ser. No. 533,236, March 10, 1966, Pat. No. 3,459,198. This application Sept. 22, 1972, Ser. No. 291,305The portion of the term of this patent subsequent to Aug. 5, 1986, has been disclaimed.

Int. Cl. A61k 7/14

U.S. Cl. 8—161 13 Claims

1. A method of removing hair from the skin of the body comprising,

applying to the hair at the skin an aqueous solution of a compound having the formula



wherein A is selected from the group consisting of hydrogen and a water soluble polar group,

B is a water soluble polar group, said solution having said compound present in a concentration of from 0.1 to 1.0M with a pH of from 7 to 13,

permitting said solution to react with said hair for a period of up to 30 minutes until a depilatory action is carried out,

and removing said solution from said skin along with reaction products and hair.

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3,865,547

## PREVENTING CORROSION DURING THE PIPELINE TRANSPORTATION OF COAL SLURRIES

Paul E. Titus, and Joseph S. Di Gregorio, both of Houston, Tex., assignors to Shell Oil Company, New York, N.Y.

Filed July 28, 1971, Ser. No. 166,851

Int. Cl. C23f 11/08; B65g 53/00

U.S. Cl. 21—2.5 R 3 Claims

1. In a method for rendering a coal-water slurry noncorrosive to a pipeline by admixture therewith of a hexavalent chromate corrosion inhibitor, the improvement comprising maintaining the coal-water slurry non-corrosive during pipeline transportation thereof by addition thereto of a minor amount of less than 1000 ppm of an inhibitor saving additive selected from the group consisting of gelatin and a reaction product of an alkyl phenol and an alkylene oxide.

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3,865,548

## ANALYTICAL APPARATUS AND PROCESS

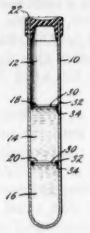
Jacques Padawer, Hastings-on-Hudson, N.Y., assignor to Albert Einstein College of Medicine of Yeshiva University, Bronx, N.Y.

Continuation-in-part of Ser. No. 262,183, June 13, 1972, abandoned. This application Mar. 5, 1973, Ser. No. 338,358

Int. Cl. G01n 1/10, 31/00, 33/16

U.S. Cl. 23—230 R 17 Claims

8. A method of carrying out chemical testing comprising introducing a fluid sample to be tested into a chamber, said sample being in contact with a first porous barrier and a second porous barrier, permitting at least some constituents of said sample to pass through said first barrier and contact a first fluid reagent, at least some of said constituents passing through said second barrier to contact a second fluid reagent



whereby the light transmission characteristics of at least one of said reagents are altered.

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3,865,549

## AUTO-ANALYTICAL APPARATUS AND ANALYTICAL METHODS

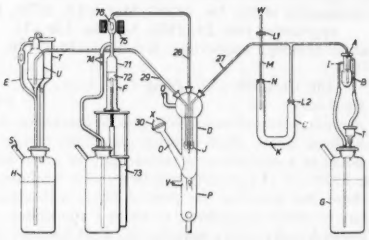
Clifford Riley, Burgess Hill, England, assignor to The Wellcome Foundation Limited, London, England

Filed Oct. 2, 1972, Ser. No. 293,889

Claims priority, application Great Britain, Oct. 7, 1971, 46639/71

Int. Cl. G01n 31/00, 31/14, 31/16

U.S. Cl. 23—230 R 25 Claims



20. A method of analysis of a liquid sample comprising the steps of drawing a predetermined quantity of the sample into one end of connecting tubing by a change of fluid pressure under control of a pressure controlled sample measuring device interconnected to an intermediate portion of the connecting tubing, moving the predetermined quantity of the sample into a reaction chamber to which the other end of the connecting tubing is applied by a further change of fluid pressure in the reaction chamber and the connecting tubing under control of a pressure control mechanism, supplying reagent to the reaction chamber and carrying out an analytical reaction on the predetermined quantity of sample in the reaction chamber.

3,865,550

## SEMI-CONDUCTING GAS SENSITIVE DEVICES

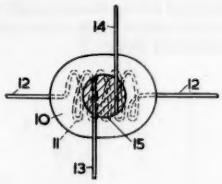
Barry Bott, Dinnington; Jack Graham Firth, Chapeltown, near Sheffield; Alan Jones, Sheffield, and Thomas Alwyn Jones, Dronfield, near Sheffield, all of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 174,910, Aug. 25, 1971, abandoned. This application Oct. 25, 1973, Ser. No. 409,453

Claims priority, application Great Britain, Mar. 30, 1973, 15577/73; Aug. 26, 1970, 41061/70

Int. Cl. G01n *27/00, 31/00;* H01c *7/00*

U.S. Cl. 23—232 E 35 Claims




1. A gas-sensitive device comprising a semi-conducting element having a surface which can be exposed to an atmosphere containing the gas to which the device is sensitive and two electrodes separately in contact with the semi-conducting element whereby an electric current can be passed between the electrodes which is dependent upon the conductivity of the element, the element consisting essentially of a semiconducting oxide of a first metal having in solid solution within its lattice system at least one further metal which constitutes an activator promoting in the system at least one metallic ionic species which reacts more strongly within a given temperature range to the presence of the gas to be detected than the predominant metallic ionic species of the unactivated semiconducting oxide, said at least one further metal being present in an activating amount, with the result that the conductivity of the element is highly dependent within the given temperature range on the concentration of the gas to be detected in the atmosphere.

3,865,551

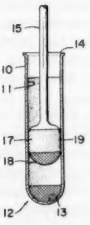
## LABORATORY ANALYSIS INSTRUMENT

Yoshiko Saiki, and Atsushi Saiki, both of 30-3, 5-chome Chuo, Ota-ku, Tokyo, Japan

Filed Nov. 17, 1972, Ser. No. 307,534

Int. Cl. B01l *11/00;* B02c *19/08;* C12k *1/10*

U.S. Cl. 23—259 4 Claims




1. A laboratory analysis instrument comprising, in combination, a tube having a closed bottom and a coarse grinding surface on the inner bottom area thereof, a fine grinding surface at the inner circumferential wall surface extending substantially to the open mouth of said tube, and a finely frosted surface on the inner circumferential wall surface in the upper mouth area of said tube; a grinding rod provided at its lower end with an enlarged diametral portion snugly insertible into said tube for grinding a sample placed into said tube, said enlarged portion having a coarse grinding surface at the bottom area of said portion and having a fine grinding surface at the circumferential wall surface of said portion; and a stopper having a frosted circumferential surface for tightly fitting into and closing the mouth of said tube to prevent thereby leakage of a sample dissolved by a solvent in said tube when shaken in a centrifuge after grinding of said sample.

3,865,552

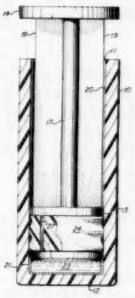
## TEST TUBE

Judith Marston, Scottsdale, Ariz., assignor to Blood Services, Scottsdale, Ariz.

Filed May 7, 1973, Ser. No. 357,883

Int. Cl. B01l *3/14;* G01n *1/10, 33/16*

U.S. Cl. 23—259 1 Claim



1. A test-tube assembly specially adapted for transporting a small quantity of a liquid while maintaining said liquid in continuous contact with a reagent coated on the inner surface of the bottom of said test tube, said assembly comprising:

a. an elongate, hollow test tube, closed on the bottom end;

b. a quantity of said reagent disposed as a coating on the inner surface of the bottom of said test tube;

c. a piston member shaped and dimensioned to be slidably received downwardly in and transversely across said test tube, sealingly peripherally engaging the inner wall of said test tube;

d. an operating handle member extending upwardly from said piston for inserting said piston member downwardly into said test tube to a point spaced above the bottom thereof at a distance to maintain said liquid in continuous contact with said reagent; and

e. means defining a pressure-relief aperture in said piston member, said aperture sized to be sensitive to the viscosity coefficient differential between said liquid and air whereby air may pass therethrough, but no liquid under transporting conditions.

3,865,553

## APPARATUS FOR CONTINUOUSLY PREPARING PERCHLORMETHYL MERCAPTAN

Jan Masat; Rudolf Dohnalek, and Jiri Chvejka, all of Prague, Czechoslovakia, assignors to Spolana, narodni podnik, Neratovice, Czechoslovakia

Division of Ser. No. 196,948, Nov. 9, 1971, abandoned. This application Oct. 30, 1972, Ser. No. 302,118

Claims priority, application Czechoslovakia, Oct. 14, 1970, 7699-70

Int. Cl. B01d *17/02;* C01b *17/45;* C07c *149/16*

U.S. Cl. 23—260 2 Claims

1. An apparatus for continuously preparing perchloromethyl mercaptan, comprising in combination,

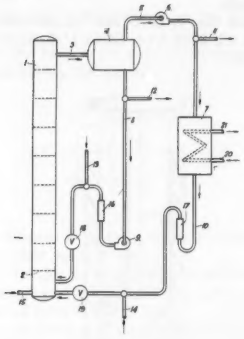
a. a reactor having a top and a bottom end portion and provided with a chlorine supply inlet and with at least one

perforated partition for mixing the components of the reaction mixture, the apertures through the partition having a total area varying between 2 and 40 percent of the overall cross-section of the reactor;

b. a cooler provided with an inlet and an outlet for supplying and withdrawing a cooling medium, respectively;

c. inlet means for introducing carbon disulphide and water; and

d. a separator for separating the aqueous and organic layers, said separator having a top and a bottom end portion as well as an inlet, the separator being directly connected via



the inlet means to the top of the reactor, pipelines extending from the top and bottom of the separator, both pipelines having a pump, the pipeline from the top being divided into a product outlet line and a discharge line which passes through the cooler to the reactor bottom, and the pipeline from the separator bottom being divided into a product outlet line and a discharge line which leads to the reactor bottom, the water supply inlet discharging into the pipeline of the inorganic layer, and the carbon disulphide supply inlet discharging into the pipeline of the organic layer.

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**3,865,554**

**PRESSURE-AND TEMPERATURE-CONTROLLED APPARATUS FOR LARGE-SCALE PRODUCTION OF CRYSTALS BY THE CZOCHRALSKI TECHNIQUE**

**Joseph F. Wenckus, Needham; Roger A. Castonguay, Salem; Bernard C. Hanfly, Chestnut Hill, and Francis J. Mallahan, Woburn, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.**

**Filed Sept. 23, 1971, Ser. No. 183,169**

**Int. Cl. B01j** *17/18*

**U.S. Cl. 23—273 SP** **12 Claims**

1. A pressure- and temperature-controlled apparatus adapted for growing crystals by the Czochralski technique, comprising in combination

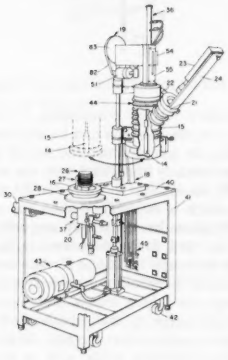
a. pressure-tight furnace means providing an enclosure defining therein a working volume the atmosphere of which may be varied with respect to temperature and to pressure from a vacuum to at least 100 atmospheres, said furnace means being formed of a main cylindrical furnace housing of essentially constant diameter throughout having a top section and bottom flange means and a furnace base member having the same inside diameter as said main furnace housing and being sealable with said main furnace housing through mating flange means to limit said atmosphere essentially to said volume;

b. furnace sealing means engageable with said mating flange means and comprising two semicircular, internally grooved members and bolt means adapted to lock said grooved members in engaged position around said mating flange means;

c. crystal-pulling rod means extending from external of said main furnace housing into said volume and movable therein in both rotational and translational modes;

d. crystal-pulling rod bearing and sealing assembly means located in said top section of said main furnace housing and providing the sole sealing means between said crystal-pulling rod means and said pressure-tight furnace means;

e. rotational and translation crystal-pulling rod driving means located external of said pressure-tight furnace means and rigidly mounted on said main furnace housing, said translational driving means including means to selectively drive said rods in a slow crystal-growing mode or in a rapid-positioning mode;



f. main furnace housing support and lifting means to which said main furnace housing is affixed, said support and lifting means being adapted to raise said main furnace housing, said crystal-pulling rod means and said crystal-pulling rod driving means as a single rigid assembly off said furnace base member and to permit said single rigid assembly to be swung around when it reaches a predetermined height;

g. crucible-support rod means extending from external of said furnace base member into said volume above said furnace base member and movable therein in both rotational and translational modes;

h. crucible-support rod bearing and sealing assembly means located in said furnace base member and providing the sole sealing means between said crucible-support rod means and said pressure-tight furnace means;

i. rotational and translational crucible-support rod driving means located external of said pressure-tight furnace;

j. rod-locating means associated with said translational driving means of said crystal-pulling rod means adapted continuously to indicate at a location remote from said furnace means the precise position of said crystal-pulling rod means within said volume;

k. crucible holding means supported on said crucible-support rod means and positioned above the upper level of said base means;

l. heating means adapted to heat the contents of a crucible held within said crucible holding means; and

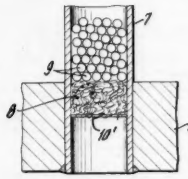
m. viewing port means providing for visual observation of said working volume.

3,865,555

## REACTOR FOR CATALYTIC GAS PHASE OXIDATION

Gunter Elebracht, and Gunter Siekmann, both of Brackwede, Germany, assignors to Rheinstahl AG, Essen, Germany

Filed June 7, 1973, Ser. No. 367,784
Claims priority, application Germany, June 28, 1972, 2231557
Int. Cl. B01j 9/04
U.S. Cl. 23—288 R 6 Claims




5. A contact tube for a catalyst reactor comprising a tubular member adapted to be seated in a tube sheet at each end and having catalyst particles arranged therein, said tubular member having an interior wall with an annular groove adjacent at least one end, and holding means arranged adjacent said at least one end of said tubular member for retaining particles therein and including a wire gauze skein disposed across said tubes adjacent to and exteriorly of said groove, and a clamping ring arranged at the exterior end of said gauze in said groove and projecting into the interior of said tube for retaining the gauze in position.

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3,865,556

## CERMET COMPOSITION CONTAINING CBC MO AND AN ADDITIONAL CARBIDE

Robert W. Harrison, Portland, Conn., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed May 29, 1961, Ser. No. 113,565
Int. Cl. C22c 29/00, 31/04
U.S. Cl. 29—182.7 1 Claim

1. A hard dense high-temperature material compatible with lithium consisting of CbC and Mo to which has been added up to 15 w/o of a refractory metal carbide selected from the group consisting of WC, TiC, and ZrC.

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3,865,557

## $AuIn_2$ AS A CRYOGENIC THERMOMETER OR REFRIGERANT

Klaus Andres; Ernest Bucher, both of Berkeley Heights, and Jack Harry Wernick, Madison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 9, 1973, Ser. No. 414,149
Int. Cl. B32b 15/00; C22c 31/00
U.S. Cl. 29—194 4 Claims

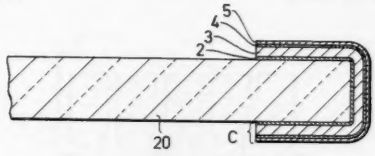
1. A device for use at temperatures below 0.1°K comprising a mass of $AuIn_2$, wherein the $AuIn_2$ contains less than a total of 2 molar parts per million of matter possessing a net electronic magnetic moment, and wherein the $AuIn_2$ contains less than 100 parts per million by volume of superconductor matter as a second phase and wherein the total content of matter, other than $AuIn_2$, is no greater than 1 percent.

3,865,558

## WINDOW

Mario Roth, Aachen-Laurensberg; Hans Peter Siemonsen, Aachen; Siegfried Kuiff, Merkstein, and Heinz Moebs, Herzogenrath, all of Germany, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed May 29, 1973, Ser. No. 364,311
Claims priority, application France, June 1, 1972, 72.19666
Int. Cl. B32b 15/04
U.S. Cl. 29—195 9 Claims




1. A window comprising a sheet of glass, a layer of silver enamel of generally strip shape baked onto a part of the surface of the sheet, a bright copper layer overlying the enamel layer, a bright nickel layer overlying the copper layer, and a bright chromium layer overlying the nickel layer.

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3,865,559

## COMPOSITE THERMOSTAT METAL

Jacob L. Ornstein, Norton, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 30, 1974, Ser. No. 438,129
Int. Cl. B32b 15/18
U.S. Cl. 29—195.5 3 Claims

1. A composite thermostat metal comprising a first outer layer of a metal of relatively high coefficient of thermal expansion having a nominal composition, by weight, of from about 71 to 76 percent manganese, from about 9 to 19 percent copper, and from about 9 to 17 percent nickel, an opposite outer layer of a metal of relatively low coefficient of thermal expansion having a nominal composition, by weight, of from about 35.5 to 36.5 percent nickel and from about 63.5 to 64.5 percent iron, and an intermediate layer of a metal having a nominal composition, by weight, of about 61.5 percent iron, about 22.0 percent chromium, about 5.75 percent aluminum, and about 0.5 percent cobalt, said intermediate metal layer being sandwiched between and metallurgically bonded to said first and opposite outer metal layers.

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3,865,560

## PROCESS FOR MANUFACTURING DECORATIVE PRODUCTS OF ALUMINUM AND ALLOYS OF ALUMINUM

Leon Sabetay, Issoire, France, assignor to Cegedur GP, Paris, France

Filed Apr. 13, 1970, Ser. No. 28,061
Claims priority, application France, Apr. 16, 1969, 69.11760
Int. Cl. B23p 3/00; C23b 9/02
U.S. Cl. 29—197.5 16 Claims

1. A process for manufacturing composite sheets including a face sheet of aluminum or an alloy of aluminum having on the surface local chemical heterogeneities capable of causing variation in tint in response to anodization comprising positioning a relatively thin composite sheet having local surface heterogeneities of a composition corresponding to the tints desired for the final anodized oxide layer to cover the entire surface of a relatively thick support plate consisting of a metal having the mechanical and/or physical properties desired for the final product, the ratio between the thickness of the support and the composite sheet being at least equal to 5, rolling the composite sheet and support for reduction in combined

thickness by an amount at least equal to 1/15 of the initial thickness.

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**3,865,561**

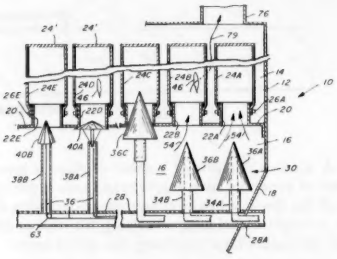
## SELECTIVE PLUGGING OF FILTER ELEMENTS

**Jack S. Osborn, 4041 S. Richmond, Tulsa, Okla. 74135**

**Continuation-in-part of Ser. No. 139,723, May 3, 1971, Pat. No. 3,712,114. This application May 18, 1972, Ser. No. 254,383**

**Int. Cl. B01d** *46/00*

**U.S. Cl. 55—18** **11 Claims**



**1.** In a self-contained closed apparatus having a single inlet for particulate laden air and a single outlet conduit for effluent for particulate free air, in which more than two particulate-matter collecting porous filter elements are positioned in a single outlet air chamber, and in which each of said elements is connected to and sealed over a separate opening in a tube sheet, said tube sheet separating an inlet air chamber from said outlet air chamber said particulate-matter-laden inlet air passing from an outlet conduit into said inlet air chamber, through said openings in said tube sheet, into said porous filter elements, through the porous walls of said elements and into said outlet chamber, said outlet chamber discharging through said outlet conduit, the method of testing the condition of any one of said elements comprising: selecting a first of the series of openings,

selectively closing off the first of said openings;

determining by measuring the concentration of particulate in the effluent whether there has been an appreciable increase in the particulate-matter-laden character of the effluent flowing through said outlet conduit;

if there has not been an appreciable increase in said character, reopening said first opening and in order selecting a second opening of the series and closing said second opening; and

determining by measuring the concentration of particles in the effluent whether there has been an appreciable increase in the particulate-matter-laden character of the effluent flowing through said outlet conduit.

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**3,865,562**

## CHROMATOGRAPHIC SEPARATING APPARATUS AND METHOD

**Buell O. Ayers, and Raymond D. McCoy, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed May 18, 1972, Ser. No. 254,742**

**Int. Cl. B01d** *15/08*

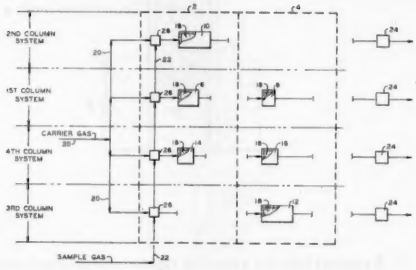
**U.S. Cl. 55—67** **10 Claims**

**1.** A method for chromatographically separating preselected components from sample fluid having a multiplicity of components, comprising:

passing a portion of said sample fluid into a first chromatographic column having a first length and having a separating material therein maintained at a first temperature ($T_1$);

separating in said first column a first group of components comprising a preselected component from the remainder of said portion of said sample fluid;

passing the thus separated first group of components from said first chromatographic column into a second chromatographic column having a second length and a separating material therein maintained at a second temperature ($T_2$), said separating material in said second column being the same as said separating material in said first column, said temperature $T_1$ being of a value in centigrade units of at least two times the value of temperature $T_2$ and the first and second column lengths being adapted




to discharge the preselected, separated component from the second column in an order equivalent to that order of discharge obtained by passing a like sample through a single chromatographic column having the same separating material maintained at a preselected temperature intermediate to the temperatures of the first and second columns;

separating in said second column at least the preselected component from the remainder of said first group of components; and

discharging the thus separated, preselected component from the second chromatographic column.

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**3,865,563**

## APPARATUS FOR WASHING PARTICULATE COMESTIBLE MATERIALS

**Edward S. Wright, Pittsburgh, Pa., and John W. Angstadt, Williamsville, N.Y., assignors to Blaw-Knox Food and Chemical Equipment, Inc., Buffalo, N.Y.**

**Division of Ser. No. 156,765, June 25, 1971, Pat. No. 3,736,182. This application Mar. 21, 1973, Ser. No. 343,231**

**Int. Cl. B01d** *53/34*

**U.S. Cl. 55—257** **1 Claim**

**1.** A condenser-separator which comprises:

a. a vessel;

b. an inlet means for introducing a gaseous mixture including water vapor and entrained oil;

c. spray means disposed within said vessel above said inlet means;

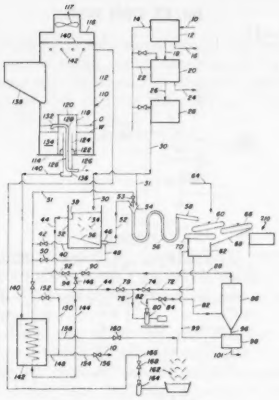
d. screen means disposed above said spray means for removing entrained oil;

e. a first conduit means disposed within and affixed to the base of said vessel thereby forming a collection and separation zone with the inner wall of said vessel for collecting a water phase and oil phase and for separating such phases, said conduit means enclosed at the top and having portal means at the base thereof;

f. a second conduit means disposed within said first conduit and affixed to the base of said vessel, said second conduit having a height lower than the height of said first conduit

means thereby forming a water overflow means and;

g. a third conduit means positioned within said collection



and separation zone, having an inlet disposed at a height whereby said inlet is within said oil phase.

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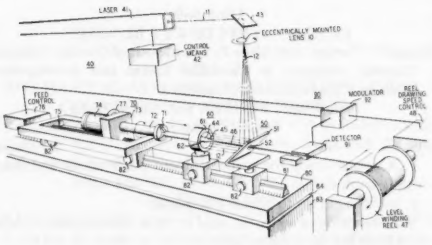
## 3,865,564
## FABRICATION OF GLASS FIBERS FROM PREFORM BY LASERS

**Raymond Edward Jaeger, Basking Ridge, and Walter Logan, Franklin, Somerset County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 9, 1973, Ser. No. 377,339**
**Int. Cl. C03b** *23/04, 37/02*
**U.S. Cl. 65—2** **13 Claims**




1. A method for drawing a glass fiber from a preform comprising the steps of:

forming a hot zone,

exposing at least a portion of the preform to the hot zone to raise its temperature to at least the softening point,

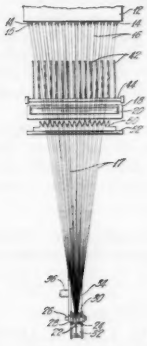
drawing a glass fiber from the softened portion of the preform,

the method characterized in that the hot zone is produced by means of a laser beam and the laser beam is introduced into the region of the hot zone with an approximately annular cross section and in a direction that is approximately colinear with the direction along which the fiber is being drawn.

## 3,865,565
## METHOD AND APPARATUS FOR GATHERING FILAMENTS INTO STRANDS

**Harry E. Spence, Pittsburgh, Pa., and Charles B. Warden, Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 10,081, Feb. 16, 1970, abandoned, which is a continuation of Ser. No. 642,849, June 1, 1967. This application Dec. 21, 1970, Ser. No. 100,524**
**Int. Cl. C03b** *37/02*
**U.S. Cl. 65—2** **11 Claims**



9. A method for drawing filaments from a molten glass source, gathering the filaments in a plurality of strands and forming a mat from the strands which comprises downwardly drawing streams of molten glass from an elongated multiple orifice bushing into attenuated filaments descending in downwardly converging fan formation, projecting parallel spaced fingers into the fan of filaments to separate them into strand groups, depositing size on the filaments in the strand groups, introducing members between the strand groups after the size has been deposited thereon to maintain them in separate relation in the fan formation, at the apex of the fan formation of filaments compacting the strand groups of filaments into strands, and depositing the compacted strands on a collecting surface to form a mat.

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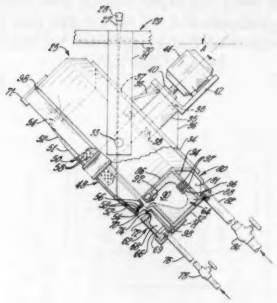
## 3,865,566
## METHOD AND APPARATUS FOR PRODUCING AND COLLECTING FIBERS

**Dale Kleist, Saint Louisville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 236,623, March 21, 1972, abandoned. This application Dec. 17, 1973, Ser. No. 425,592**
**Int. Cl. C03b** *37/04*
**U.S. Cl. 65—6** **14 Claims**

1. The method of forming and collecting fibers of heat-softened fiber-forming material including rotating a spinner having an orificed peripheral wall region and an imperforate floor region about an axis disposed at an acute angle with respect to a horizontal plane, feeding heat-softened material from a supply onto the imperforate floor region of the rotating spinner, projecting streams of the material from the orificed wall region of the spinner under the influence of centrifugal forces of rotation of the spinner, attenuating the streams to fibers whereby the attenuated fibers in column formation move downwardly away from the spinner and generally paral-

lel with the axis of the spinner, engaging fibers of the moving column by jets of gas to deflect the fibers in directions generally parallel with and downstream of a moving fiber-collecting surface, and collecting the fibers on the moving surface.



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**3,865,567**

**METHOD OF SEALING A METAL ARTICLE TO A GLASS OR CERAMIC ARTICLE IN A VACUUM-TIGHT MANNER**

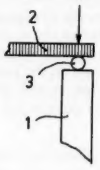
**Johannes Theodorus Klomp; Adrianus Johannes Cornelis Van De Ven, both of Emmasingle, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, Inc., New York, N.Y.**

**Filed July 12, 1973, Ser. No. 378,591**

**Claims priority, application Netherlands, July 20, 1972, 10011**

**Int. Cl. C03c** *27/04*

**U.S. Cl. 65—43** **5 Claims**



**1.** A method of sealing articles in a vacuum-tight manner wherein at least the surfaces to be sealed consist of at least one of glass, ceramic, and metal, comprising the steps of:

a. providing between said surfaces a sealing body having a substantially circular cross-section and comprising a metal of the group consisting essentially of aluminum, aluminum alloy, lead, and lead alloy;

b. heating at least said surfaces and sealing body to an elevated sealing temperature that is below the softening point of said glass, the softening point of said ceramic material, and

c. pressing said articles together at said sealing temperature and at a pressure and loading rate that provides plastic deformation of said sealing body, and a joint thereof to the surfaces to be sealed prior to the re-formation of oxide films on the deformed surface portions of said sealing body.

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**3,865,568**

**METHOD FOR FABRICATING A NATURAL FERTILIZER**

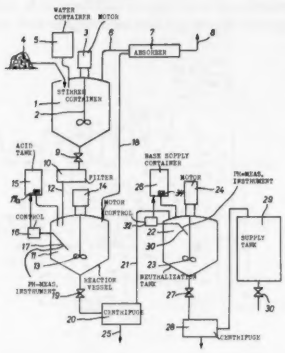
**Beat Kratzer, Hauptstrasse 91, Diessenhofen, Switzerland**

**Filed Sept. 19, 1973, Ser. No. 398,803**

**Claims priority, application Austria, Sept. 26, 1972, 8286/72**

**Int. Cl. C05f** *3/00*

**U.S. Cl. 71—21** **25 Claims**



**1.** A method for the production of a natural fertilizer comprising the steps of:

1. treating a mixture of animal secretions with a mineral acid until attaining a pH-value in the range of 0.1 to 2 and maintaining such pH-value substantially constant;
2. agitating the mixture obtained by step (1) for a period in the order of to 60 hours in order to decompose said mixture;
3. separating the thus obtained liquid phase from undissolved solids;
4. regulating the pH of the liquid freed of solids obtained during step (3) above by the addition of a basic substance so as to attain a value of at least 5.

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**3,865,569**

**PRESERVATION OF CUT BLOOMS**

**Edwin V. Parups, and Allan P. Chan, both of Ottawa, Ontario, Canada, assignors to Canadian Patent and Development Limited, Ottawa, Ontario, Canada**

**Filed Mar. 22, 1973, Ser. No. 343,916**

**Int. Cl. A01n** *3/02*

**U.S. Cl. 71—68** **10 Claims**

**1.** A composition for preserving cut plant stems and floral blooms comprising:

a. sucrose, in up to about 500 parts;

b. isoascorbic or ascorbic acid or their soluble salts in from about 0.8 to 2 parts; and

c. 8-hydroxyquinoline, or its soluble salts in from about 0.4 to 1 part, all by wt.

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**3,865,570**

**PLANT GROWTH STUNTING PROCESS**

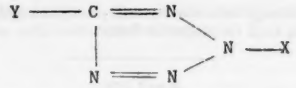
**Edwin Francis George, Eversley; William Duncan Riddell, Windsor, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Feb. 13, 1973, Ser. No. 332,221**

**Int. Cl. A01n** *5/00, 9/22*

**U.S. Cl. 71—76** **7 Claims**

**1.** A method of stunting the growth of plants, which comprises applying to the locus thereof in an amount sufficient to stunt the growth thereof a compound of the formula:



wherein Y is phenyl or substituted phenyl wherein the substituent is selected from the group consisting of $C_1$ to $C_4$ alkyl, halogen, cyano and nitro; and X is hydrogen, hydroxyalkyl or carboxyalkyl of 2–5 carbons, $CO.OCH_3$, $CO.OC_2H_5$, $CO.OC_6H_5$ and $CO.O.CH_2C_6H_4Cl$.

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3,865,571

## METHOD FOR SELECTIVE HERBICIDAL TREATMENT OF CEREAL AND CARROT CULTURES

**Max Schuler, Arlesheim, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland**

**Continuation-in-part of Ser. No. 882,293, Dec. 4, 1969, abandoned, which is a continuation-in-part of Ser. No. 743,589, July 10, 1968, abandoned, which is a continuation of Ser. Nos. 583,108, Sept. 29, 1966, abandoned, and Ser. No. 583,109, Sept. 29, 1966, abandoned. This application July 27, 1972, Ser. No. 275,506**

**Int. Cl. A01h** *9/20*

**U.S. Cl. 71—120** **11 Claims**

**1.** A method of selectively combatting weeds in a wheat locus to be protected from weeds comprising applying to the wheat locus the compound N-(3-chloro-4-methoxyphenyl)-N′,N′-dimethylurea in an amount of from 2 to 10 kilograms per hectare of said wheat locus.

**8.** A method of selectively combatting weeds in a carrot locus to be protected from weeds comprising applying to the carrot locus the compound N-(3-chloro-4-methoxyphenyl)-N′,N′-dimethylurea in an amount of from 2 to 10 kilograms per hectare of said carrot locus.

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3,865,572

## MECHANICAL ALLOYING AND INTERDISPERSION COLD BONDING AGENTS THEREFOR

**Gordon Lloyd Fisher, Mahwah, N.J., and Calvin Robert Cupp, Suffern, N.Y., assignors to The International Nickel Company, New York, N.Y.**

**Filed Jan. 29, 1973, Ser. No. 327,323**

**Int. Cl. B22f** *9/00*

**U.S. Cl. 75—0.5 R** **5 Claims**

**1.** In the process of producing mechanically alloyed composite product powder particles, the improvement which comprises conducting the mechanical alloying operation in the presence of an inorganic interdispersion cold bonding agent (ICBCA) formed of a halide, the halide being in contact with the powder particles to be mechanically alloyed and being present in an amount effective to provide the necessary control balance during the course of the operation with the upper limit being about 3% by weight of the powder charge, the control balance being such that an intimate interdispersion of constituent powders is achieved without either the formation of an appreciable amount of detrimentally large composite particles or the deleterious adherence of powders to the milling elements or mill interior surfaces and without incurring serious impairment of the mechanical properties of the composition to be produced.

3,865,573

## MOLYBDENUM AND FERROMOLYBDENUM PRODUCTION

**Norbert F. Neumann, Rye, N.Y., and Peter B. Crimes, Sudbury, Mass., assignors to Kennecott Copper Corporation, New York, N.Y.**

**Filed May 23, 1973, Ser. No. 363,284**

**Int. Cl. C22b** *1/14, 49/00*

**U.S. Cl. 75—3** **12 Claims**

**1.** The process of making a molybdenum briquette containing individually distinct particles of metallic molybdenum capable of penetrating steel slags comprising the steps of

a. charging molybdenum oxides to a reduction furnace,

b. reducing with a gaseous reducing agent in a first stage at a temperature from about 550° to less than 650°C substantially all the molybdenum trioxide in said molybdenum oxides to molybdenum dioxide,

c. reducing with a gaseous reducing agent in a second stage at a temperature between about 800° and 900°C substantially all the molybdenum dioxide to metallic molybdenum,

d. crushing the metallic molybdenum, and dioxide.

e. briquetting said crushed metallic molybdenum to a density greater than about 3.5 while retaining individually distinct particles of metallic molybdenum.

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3,865,574

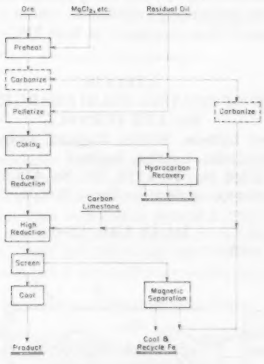
## PROCESS FOR THE PRODUCTION OF LOW-SULFUR PREREDUCED IRON PELLETS

**Raymond H. Long, Morristown, N.J., and William V. Bauer, New York, N.Y., assignors to The Lummus Company, Bloomfield, N.J.**

**Filed July 20, 1972, Ser. No. 273,522**

**Int. Cl. C21b** *1/28*

**U.S. Cl. 75—4** **34 Claims**




**1.** A process for producing pre-reduced iron oxide pellets of low-sulfur content from ore and a sulfur-bearing fluid carbonaceous material comprising:

pelletizing said ore and a minor proportion of a sulfur-scavenging compound by spraying said carbonaceous material thereon while agitating same, said carbonaceous material being heated to a flowable temperature and maintaining the temperature in the pelletizing mixture below the cracking temperature and said carbonaceous material;

coking the pellets thus formed, the coked pellets containing sufficient carbon to effect about 25 to 70 percent reduction of said ore;

heating the coked pellets to raise the temperature of the pellets to a final reduction temperature in the range of 1,900° to 2,100°F, during said heating the temperature of

the pellets being raised from 1,500°F to said final temperature in less than about 1 hour; and

retaining said pellets at said final temperature for from ½ to 2 hours.

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**3,865,575**

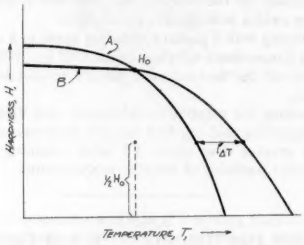
## THERMOPLASTIC PREALLOYED POWDER

**Timothy Earl Volin, Tuxedo; John Stanwood Benjamin, Suffern; Jay Michael Larson, Warwick, and Robert Lacock Cairns, Suffern, all of N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.**

**Filed Dec. 18, 1972, Ser. No. 316,077**

**Int. Cl. B22f 9/00**

**U.S. Cl. 75—.5 R** **4 Claims**




1. New and improved superalloy prealloy powder, said powder containing up to 60% chromium, up to 30% cobalt, up to 8% titanium, up to 30% molybdenum, up to 25% tungsten, up to 10% columbium, up to 10% tantalum, up to 7% zirconium, up to 0.5% boron, up to 5% hafnium, up to 6% copper, up to 5% manganese, up to 70% iron, up to 4% silicon, and the balance essentially nickel, and being further characterized in that it is in the strain energy induced condition with a Thermoplastic Physical Characteristic of at least TPC—1.

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**3,865,576**

## METHOD OF MELTING SOLID CHARGES IN OPEN HEARTH FURNACE

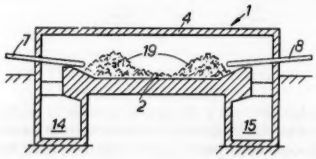
**James Albert Latham, Bilston, England, assignor to British Steel Corporation, London, England**

**Filed Dec. 27, 1973, Ser. No. 428,653**

**Claims priority, application Great Britain, Jan. 11, 1973, 1566/73**

**Int. Cl. C21c 5/04**

**U.S. Cl. 75—43** **12 Claims**




1. A method of steelmaking in an open hearth furnace having a downtake channel and an uptake channel at opposite ends of the furnace proper and burners at both said ends wherein regenerative melting and refining is conducted comprising the steps of introducing

solid charges into the furnace at both ends adjacent the burners and, following completion of charging and before conducting the regenerative melting/refining cycle,

simultaneously firing the burners at both ends whereby the charges at both ends of the furnace are at least partially melted, and exhausting the gaseous products of combustion through both said downtake and the uptake channels during such simultaneous firing.

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**3,865,577**

## BODY FOR DEOXIDIZING MOLTEN STEEL BY SUBMERSION THEREIN

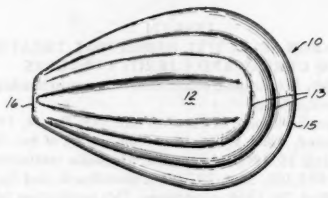
**Hans Joachim Gottschol, Gevelsberg, and Karl Josef Gottschol, Herdecke, both of Germany, assignors to Metallurgische Forschungsanstalt, Vaduz, Liechtenstein**

**Filed Dec. 18, 1972, Ser. No. 316,431**

**Claims priority, application Germany, Dec. 20, 1971, 7147854[U]**

**Int. Cl. C21c 7/00; B22f 5/00**

**U.S. Cl. 75—58** **6 Claims**




1. A body for use in deoxidizing molten steel by submersion of the body into the molten steel, said body consisting of a metal for deoxidizing molten steel and said body being solid with a surface configuration of at least one substantially flat surface being disposed on one side of the body and the surface of the body adjacent the flat surface sloping inwardly from the edge of the flat surface, said flat surface having a shape of a cross section of a teardrop which cross section extends substantially parallel to the major axis of the teardrop.

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**3,865,578**

## COMPOSITION FOR TREATING STEELS

**Masaru Takashima, Wakabayashi, Japan, assignor to Aikoh Co., Ltd., Tokyoto, Japan**

**Filed Jan. 16, 1973, Ser. No. 324,244**

**Claims priority, application Japan, Jan. 25, 1972, 47-9220**

**Int. Cl. C21c 7/02; C22b 9/10; B23r 35/34**

**U.S. Cl. 75—58** **3 Claims**

1. A composition for treating molten steel consisting essentially of 3–40 wt. % of lithium fluoride, 15–50 wt. % of sodium fluoride, 30–70 wt. % of calcium fluoride and 1–3 wt. % of $K_2TiF_6$, and having a melting point between 600° and 1,100°C.

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**3,865,579**

## METHOD AND APPARATUS FOR THE PRODUCTION OF STEEL

**Olin E. Williams, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 00,679, Jan. 5, 1970, abandoned. This application May 1, 1972, Ser. No. 249,318**

**Int. Cl. C21c 5/30**

**U.S. Cl. 75—60** **11 Claims**

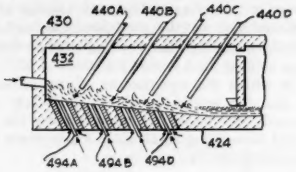
1. A method for the continuous production of steel comprising,

introducing molten metal into a trough-like furnace,

said furnace having an inclined base portion for the gravity flow of molten metal downwardly thereover,

contacting said molten metal flowing by gravity in said furnace with at least one stream of oxygen whereby said molten metal is at least partially refined and a slag is formed on the upper surface of said flowing molten metal,

opposing the gravity flow of said molten metal in said furnace with said stream of oxygen,




withdrawing said slag from said furnace, and
withdrawing said refined molten metal from said furnace.

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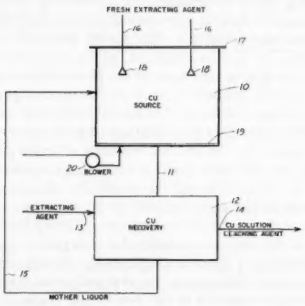
**3,865,580**
**COPPER RECOVERY PROCESS**

**Theodore W. Hummel, 187 Maplewood Ave., Rochester, N.Y. 14613, and Paul C. Schroy, 336 Yarmouth, Rochester, N.Y. 14610**

**Continuation of Ser. No. 210,435, Dec. 21, 1971, abandoned. This application Sept. 14, 1973, Ser. No. 397,386**
**Int. Cl. C01g** *3/00, 3/14;* **C22b** *15/10*
**U.S. Cl. 423—32** **11 Claims**




**1.** The method of extracting copper metal from natural sources carrying elemental copper or from copper scrap which comprises the steps of

1. contacting the copper-bearing material with a solution in water of
   a. ammonium carbonate in concentration range 10–50 with ammonia in range up to saturation, and
   b. 1 – 25 per cent of a water soluble iron compound comprising iron chelated with a mixture of from 50 to 90 parts of an aliphatic polyhydroxy mono-carboxylic acid,
   c. from 5 to 25 parts of a hydroxy-alklamine polycarboxylate and
   d. from 5 to 25 parts of a polyamine polycarboxylate in which all amine hydrogens have been replaced by carboxyl-containing aliphatic radicals which retains in solution both ferrous and ferric form in the ammonia plus ammonium carbonate solution, said ammonium carbonate solution being held at a pH in excess of about 7,
2. while maintaining said copper-bearing material in contact with the aqueous solution of ammonium carbonate and iron chelate,
3. contacting said solution with air, or oxygen, to induce aeration of the copper solution interface
4. returning any drain-off of said solution containing chelating agent and ammonium carbonate together with solubilized copper from said copper-bearing material for further extraction and solution of copper in the ammoniated ammonium carbonate solution,
5. thereby to develop a solution of copper approaching saturation as a limit,
6. and ultimately passing the copper in solution to a copper recovery stage.

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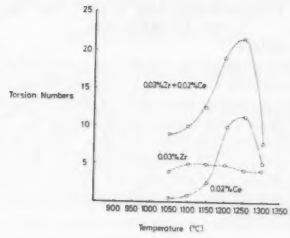
**3,865,581**
**HEAT RESISTANT ALLOY HAVING EXCELLENT HOT WORKABILITIES**

**Shozo Sekino; Mizuo Sakakihara, and Shoji Murota, all of Fukuoka-ken, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Jan. 24, 1973, Ser. No. 326,459**
**Claims priority, application Japan, Jan. 27, 1972, 47-9479**
**Int. Cl. C22c** *19/00, 28/00*
**U.S. Cl. 75—122** **3 Claims**




**1.** A heat resistant alloy having hot workability consisting essentially of 0.01 to 0.5% of C, 0.01 to 2.0% of Si, 0.01 to 3.0% of Mn, 22 to 80% of Ni and 10 to 40% of Cr as basic components together with one or both of 0.0005 to 0.20% of B, and 0.001 to 6.0% of Zr and further one or more of 0.001 to 0.5% of Ce, 0.001 to 0.2% of Mg and 0.001 to 1.0% of Be, with the balance being iron and unavoidable impurities.

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**3,865,582**
**ALLOY ADDITIVE**

**Nathan Lewis Church, Mentor, Ohio, and John Joseph DeBarbadillo, II., Warwick, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.**

**Filed July 6, 1973, Ser. No. 377,140**
**Int. Cl. C22c** *35/00*
**U.S. Cl. 75—122** **5 Claims**

**1.** A composition of matter particularly adapted for use as an additon agent to ferrous molten baths and consisting of by weight from about 3 to 5.5 percent magnesium, about 19 to 24 percent nickel, about 15 to 28 percent silicon and the balance essentially iron, said composition being characterized by relatively low reactivity and low smoke emission as a consequence of having been introduced into a molten ferrous body, excellent magnesium recovery not only in respect of the ferrous base product produced but also in terms of recovery as a result of the preparation of the composition per se, and also good crushability such that excessive fines are avoided.

3,865,583

## METHOD OF ADDING MANGANESE TO ALUMINUM

James D. Kline, Bay Village, Ohio; William C. T. Yeh, West Chester, and Ulysses A. Preston, Paoli, both of Pa., assignors to Foote Mineral Company, Exton, Pa.

Division of Ser. No. 161,876, July 12, 1971, Pat. No. 3,793,007. This application May 4, 1973, Ser. No. 357,351

Int. Cl. C22c *1/02*

U.S. Cl. 75—138 8 Claims

1. In a method for the direct addition of manganese metal to molten aluminum to form a manganese-containing aluminum alloy, the improvement which comprises adding the manganese metal in finely particulate form in intimate admixture with a a nonhygroscopic metal salt flux which forms a molten phase at the temperature of the molten aluminum to which said manganese-flux mixture is added; said manganese metal being substantially all minus 14 mesh and said flux being present in an amount of from about 3 to about 10 percent by weight of the manganese-flux mixture.

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3,865,584

## ARTICLES FOR ADDING MANGANESE TO ALUMINUM

James D. Kline, Bay Village, Ohio; William C. T. Yeh, West Chester, and Ulysses A. Preston, Paoli, both of Pa., assignors to Foote Mineral Company, Exton, Pa.

Division of Ser. No. 161,876, July 12, 1971, Pat. No. 3,793,007. This application May 4, 1973, Ser. No. 357,256

Int. Cl. B32b *5/16*

U.S. Cl. 29—191.2 2 Claims

1. An article comprising a container consumable in a bath of molten aluminum containing a predetermined quantity of a composition consisting essentially of about 90 to 97 percent of finely particulate manganese metal and about 3 to 10 percent of a nonhygroscopic metal salt flux, based on the weight of the total composition, substantially all of said manganese metal being minus 14 mesh and said flux forming a molten phase at the temperature of molten aluminum to which said composition is added.

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3,865,585

## COBALT CHROMIUM BASED ALLOY

Leo Rademacher, Witten-Heven, Germany, assignor to Edelstahlwerk Witten Aktiengesellschaft, Witten, Germany

Filed May 22, 1973, Ser. No. 362,867

Claims priority, application Germany, May 26, 1972, 2225577

Int. Cl. C22c *19/00*

U.S. Cl. 75—171 10 Claims

1. An alloy consisting essentially of from 26 percent to 31 percent chromium, from 4 percent to 6.5 percent molybdenum, up to 2 percent silicon, up to 6 percent manganese, up to 1 percent iron, up to 0.5 percent boron, up to 0.5 percent carbon, from 0.15 percent to 0.5 percent nitrogen, with the balance being cobalt and impurities, the sum of said carbon content and said nitrogen content not exceeding 0.7 percent.

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3,865,586

## METHOD OF PRODUCING REFRACTORY COMPOUND CONTAINING METAL ARTICLES BY HIGH ENERGY MILLING THE INDIVIDUAL POWDERS TOGETHER AND CONSOLIDATING THEM

Timothy Earl Volin, Tuxedo, and John Stanwood Benjamin, Suffern, both of N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Nov. 17, 1972, Ser. No. 307,358

Int. Cl. B22f *1/00*

U.S. Cl. 75—203 6 Claims

1. A process for producing a hard refractory body having at least one refractory compound dispersed throughout a metal matrix, the refractory compound(s) constituting at least about 40% by volume of the refractory body, which comprises forming a powder charge containing (i) a plurality of powder particles containing at least one hard refractory compound forming metal, (ii) powder particles of at least one constituent capable of combining with the refractory forming metal(s) to form the desired refractory compound(s), the said constituent being present in at least a stoichiometric relation to the refractory metal, and (iii) powder particles of at least one matrix binder metal, subjecting the powder charge to dry, intensive, high energy milling for a period sufficient to form composite particles in which the constituents of the refractory compound(s) and the matrix metal are intimately united and interdispersed, and thereafter consolidating the composite particles and sintering at an elevated temperature to produce the desired hard refractory body.

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3,865,587

## ELECTROPHOGRAPHIC BICHARGEABLE MATERIALS AND PROCESS

Robert Joseph Noe, Mortsel, Belgium, assignor to Agfa-Gevaert N.V., Mortsel, Belgium

Filed July 19, 1972, Ser. No. 273,056

Claims priority, application Great Britain, July 20, 1971, 34046/71

Int. Cl. G03g *5/08, 13/22*

U.S. Cl. 96—1 PC 2 Claims

1. An electrophotographic process for producing selectively positive or negative copies of a given original comprising the steps of: uniformly corona charging a bi-chargeable photoconductive recording material comprising a photoconductive recording layer comprising an electrically insulating binder and dispersed therein a mixture of photoconductive zinc oxide particles and positively chargeable particles of the group consisting of barium sulphate, silica, and polyethylene, the ratio by weight in said layer of the photoconductive zinc oxide particles with respect to said positively chargeable particles ranging from 10:90 to less than 50:50, the recording layer containing the dispersed mixture of particles in a proportion with respect to the binder material of from 50 to 97% by weight, the zinc oxide particles having a grain size in the range of 0.1 to 15 micron and the positively chargeable particles a grain size in the range of $10^{-2}$ to 50 microns,

said uniform charge having one polarity for positive copy and the opposite polarity for a negative copy,

exposing said layer to a light image of said original to dissipate said charges in the exposed areas while leaving the charges retained in the non-image areas, and

developing the exposed sheets by contacting the same with toner particles charged with the same polarity for both positive and negative copies.

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3,865,588

## PLANOGRAPHIC PLATE WITH A POLYMERIZABLE ORGANOPOLYSILOXANE COMPOUND

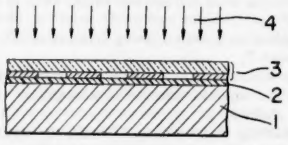
Michihiro Ohto, Tokyo; Atsumi Noshiro, Yokohama; Tetsuya Mayuzumi, and Toji Fujino, both of Annaka, all of Japan, assignors to Dai Nippon Printing Co., Ltd. and Shinetsu Chemical Co., both of Tokyo, Japan

Filed Feb. 22, 1972, Ser. No. 226,951

Claims priority, application Japan, Feb. 20, 1971, 46-7737; Mar. 5, 1971, 46-11338; Sept. 1, 1971, 46-67212; Sept. 10, 1971, 46-70177

Int. Cl. G03f *7/02*

U.S. Cl. 96—33 17 Claims



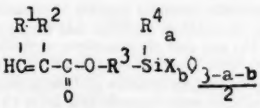

1. A planographic printing plate comprising a base plate having ink-receptive and ink-repellent areas thereon, said

ink-repellent area being constituted of a polymerized and cured layer which is produced by the steps of

a. providing on the surface of said base plate a dried layer of a polymerizable and curable composition comprising

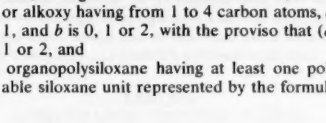
A. an organopolysiloxane selected from the group of

1. organopolysiloxane having at least one polymerizable siloxane unit represented by the formula



where $R^1$ is hydrogen, phenyl or halogen-substituted phenyl, $R^2$ is hydrogen or methyl, $R^3$ is an unsubstituted or halogen-substituted divalent hydrocarbon, having from 1 to 10 carbon atoms, $R^4$ is an unsubstituted or halogen-substituted monovalent hydrocarbon, having from 1 to 10 carbon atoms, X is hydroxy or alkoxy having from 1 to 4 carbon atoms, $a$ is 0 or 1, and $b$ is 0, 1 or 2, with the proviso that $(a+b)=0$, 1 or 2, and

2. organopolysiloxane having at least one polymerizable siloxane unit represented by the formula



wherein $R^1$, $R^2$, $R^3$, $R^4$ and X are as defined above, l is 0 or 1 and $m$ and $n$ are 0, 1 or 2 with the proviso that $(m+n)=0$, 1 or 2,

B. a photosensitizer, and

C. a solvent,

b. pressing a positive pattern onto the composition layer thus provided,

c. subjecting the treated base plate to an imagewise exposure to actinic radiation from above said positive pattern, to polymerize and cure said composition layer in the exposed areas,

d. subjecting the treated base plate to a development treatment to remove the unexposed areas to expose the surface of said base plate, and

e. then fixing the images.

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**3,865,589**

**PHOTOHARDENABLE LAYER WITH INTEGRAL SUPPORT OF FABRIC OR MESH**

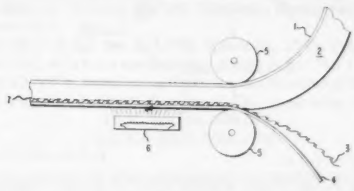
**John Thomas Freeman, Freehold; Robert Bernard Heiart, Middletown, and Ernst Leberzammer, New Brunswick, all of N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 11, 1973, Ser. No. 322,902**

**Int. Cl. G03c** *5/00, 1/86, 1/68*

**U.S. Cl. 96—35.1** **9 Claims**

1. In a photosensitive element comprising a solid layer of photopolymerizable material comprised of (a) an organic polymer binding agent, (b) an ethylenically unsaturated compound capable of forming a high polymer by photoinitiated polymerization, and (c) an addition polymerization initiator activatable by actinic light, the improvement comprising a



polymerized stratum of said layer located on one side of said layer containing a fabric or mesh reinforcing material.

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**3,865,590**

**GRAVURE PRINTING PLATES**

**David Lionel Cohen, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed May 29, 1973, Ser. No. 364,636**

**Claims priority, application Great Britain, June 30, 1972, 30768/72**

**Int. Cl. G03f** *5/00, 7/24*

**U.S. Cl. 96—38** **3 Claims**

1. In a process for the manufacture of Gravure printing plates which comprises:

a. producing a hardened cell pattern in a surface of a layer of a composition comprising a resin material which is hardenable on exposure to electro-magnetic radiation, (hardening radiation), and a silver halide in which, as a result of exposure to electro-magnetic radiation insufficient to cause appreciable hardening of the resin, an image can be produced which is resistant to the transmission of hardening radiation,

b. producing in that surface of the layer an image in material which is resistant to the transmission of hardening radiation,

c. exposing the layer to hardening radiation, preferably through its other surface, and

d. removing from the first surface of the layer from within the hardened cell walls relatively less hardened resin, the improvement which comprises submitting the resin material after exposure to electro-magnetic radiation in step (a) to an oxidative treatment prior to step (c) whereby the effect of fogging of the image is ameliorated.

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**3,865,591**

**GENERAL PURPOSE DEVELOPER**

**Jerome Katz, Rochester, N.Y., assignor to Delaware Photographic Products, Inc., Buffalo, N.Y.**

**Filed May 10, 1973, Ser. No. 358,936**

**Int. Cl. G03c** *5/30*

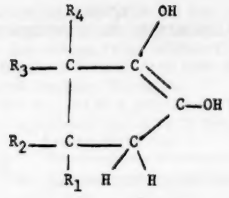
**U.S. Cl. 96—66.3** **27 Claims**

1. A silver halide photographic developing composition having a pH in the range 8 – 9.5 comprising the following ingredients in the weight proportion ranges indicated per liter of composition:

3-pyrazolidone developer..... 0.8 to 3 grams

dihydroxybenzene developer selected from the group consisting of hydroquinone, resorcinol and pyrocatechol..... 0 to 14 grams

enediol developer selected from the group consisting of ascorbic acid, d-araboascorbic acid, reductic acid, 2-oxytetronic acid, 4-aryl-2-oxytetronic acid, 4-aryl-2-oxytetronimide, isoascorbic acid and enediols having the chemical structure represented by the formula



wherein

$R_1$, $R_2$, $R_3$ and $R_4$ are selected from the group consisting of hydrogen and the radical $-CH_2R_5$, $R_5$ is selected from hydrogen and a monovalent radical selected from the group consisting of amino, cyano, halo, hydroxyl, carboxyl, sulfonyl, alkyl, cycloalkyl, aryl of the benzene or naphthalene series and alkaryl of the benzene or naphthalene series, at least one of said $R_1$, $R_2$, $R_3$ and $R_4$ being the radical $-CH_2R_5$ ..... 2 to 19 grams

inorganic sulfite preservative ..... 20 to 75 grams

silver halide solvent selected from sodium and potassium thiocyanate ..... ¼ to 2½ grams

graininess reducer selected from the alkali metal chlorides ..... 4 to 30 grams

restrainer ..... ¼ to 2 grams

buffering agent ..... 2 to 40 grams.

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**3,865,592**

**IMAGE-RECEIVING ELEMENT FOR USE IN PHOTOGRAPHIC SILVER SALT DIFFUSION TRANSFER PROCESS**

**Kinji Ohkubo, and Kazunobu Kato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sept. 16, 1971, Ser. No. 181,209**

**Claims priority, application Japan, Sept. 28, 1970, 45-84537**

**Int. Cl. G03c** *1/48*

**U.S. Cl. 96—76 R** **9 Claims**

1. A method for producing an image-receiving element suitable for use in a silver diffusion transfer photographic process comprising:

providing an aqueous dispersion of silicon dioxide having an acidic to neutral pH;

adding to said aqueous dispersion an alkali agent to adjust the pH to not less than 8.0;

thereafter reacting in said aqueous dispersion of silicon dioxide a water-soluble heavy metal salt with either or both a water-soluble metal sulfide and a water-soluble metal selenide to form a precipitate of a water-insoluble metal sulfide and/or selenide; applying the resulting reaction liquor onto a support; and drying.

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**3,865,593**

**PHOTOGRAPHIC FILM UNIT FOR A PHOTOGRAPHIC DIFFUSION TRANSFER COLOR PROCESS CONTAINING COUPLER-DEVELOPERS**

**Yoshinobu Yoshida, Kanagawa, Japan, assignor to Fuji Photo Film Co. Ltd., Kanagawa, Japan**

**Filed July 2, 1973, Ser. No. 376,062**

**Claims priority, application Japan, July 5, 1972, 47-67244**

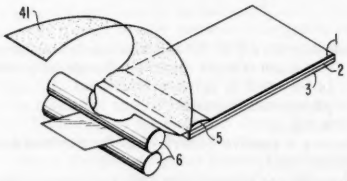
**Int. Cl. G03c** *1/40, 7/00, 5/54*

**U.S. Cl. 96—77** **49 Claims**

1. A photographic film unit for diffusion transfer color process which is adapted to be processed by passing the unit betw en a pair of juxtaposed pressure-applying members and which comprises the combination, in sequence, of

1. an image-receiving element having formed on a transparent support a mordant layer,
2. a photosensitive element having at least one photosensitive silver halide emulsion layer,
3. a water impermeable sheet, and
4. at least one of
   a. a rupturable container capable of releasing, upon rupturing, its contents between said image-receiving element (1) and said photosensitive element (2) and
   b. a rupturable container capable of releasing, upon rupturing, its content between said photosensitive element (2) and said water impermeable sheet (3), said photosensitive element (2) containing a substantially colorless and diffusible compound which develops silver halide and which is capable of forming a dye by reaction with the oxidation product of an aromatic primary amino compound, at least one of said rupturable containers retaining an alkaline processing solution,

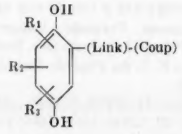
A. said film unit containing an aromatic primary amino compound and an oxidizing agent together or separately in one or more members of said image-receiving element (1), said photosensitive element (2), said water impermeable sheet (3) or at least one of said rupturable containers (a) and (b), and




B. said film unit containing a shading agent in

i. at least one of a layer disposed between the photosensitive silver halide emulsion layer of the photosensitive element (2) most adjacent to the image-receiving element and the mordant layer of the image-receiving element and said rupturable container (a) or

ii. at least one of said impermeable sheet (3) or said rupturable container (b) wherein said substantially colorless and diffusible compound is represented by the general formula




wherein (Coup) stands for a coupler group, (Link) stands for a group connecting (Coup) and the hydroquinone nucleus, and $R_1$, $R_2$, and $R_3$ each stands for a hydrogen atom, a hydroxy group, a halogen atom, an alkoxyl group or an alkyl group.

3,865,594

## LIGHT SENSITIVE PHOTOGRAPHIC MATERIAL

Walter Gauss; Siegfried Petersen, both of Cologne; Erwin Ranz, Leverkusen; Wolfgang Himmelmann, Opladen, and Harald von Rintelen, Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed June 4, 1973, Ser. No. 366,288

Claims priority, application Germany, June 9, 1972, 2228110

Int. Cl. G03c *1/70, 1/72*

U.S. Cl. 96—84 R 11 Claims

1. A light-sensitive photographic material containing a supported of self-supported light-sensitive layer which contains a light-sensitive 2-(1,2,4-triazolyl-(1))-1,4-naphthoquinone being substituted with a saturated or olefinically unsaturated aliphatic group attached to an ether oxygen atom in the 3-position of the naphthoquinone system.

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3,865,595

## LITHOGRAPHIC PRINTING PLATES

Leonard James Watkinson, Leeds, England, assignor to Howson-Algraphy Limited, London, England

Filed Nov. 9, 1972, Ser. No. 304,978

Int. Cl. G03c *1/78*

U.S. Cl. 96—87 R 6 Claims

1. A sheet material suitable for the production of a bimetallic lithographic printing plate, which sheet material comprises

a. a base metal layer formed of alunimum or aluminum alloy.

b. a bimetallic layer, one metal of the bimetallic layer being an ink-receptive metal and the other metal of the bimetallic layer being a water-receptive metal, and

c. an anodic layer on the base metal layer to form an electrically insulating barrier layer between the base metal layer and the bimetallic layer

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3,865,596

## DIRECT-POSITIVE REDUCTION AND GOLD FOGGED AMMONIAC SILVER HALIDE EMULSION

Tetsuo Furuya, Ashigara; Yoshio Ibe, and Hideo Kanisawa, both of Odawara, all of Japan, assignors to Koniskinoku Photo Industry Co., Ltd., Tokyo, Japan

Filed June 11, 1973, Ser. No. 368,868

Claims priority, application Japan, June 17, 1972, 47-60043

Int. Cl. G03c *1/28*

U.S. Cl. 96—108 6 Claims

1. A direct positive silver halide photosensitive material comprising an ammoniac silver halide photosensitive emulsion and(a) at least one compound selected from soluble rhodium salts and soluble iridium salts, said compound having been incorporated into said emulsion in an amount of 0.001 to 10 millimoles per mole of the silver halide before or at physical ripening, (b) a reducing agent in an amount of 0.001 to 100 millimoles per mole of the silver halide, (c) a gold compound in an amount of 0.0001 to 0.1 millimoles per mole of the silver halide, (d) at least 105 mol percent, based on said gold compound, of at least one compound selected from thiosulfates, thiocyanates, prussic acid salts, and (e) an optical sensitizing dye, said reducing agent and said gold compound being present in sufficient amounts to cause fogging of said silver halide.

3,865,597

## ADDITIVES TO NEGATIVE PHOTORESISTS WHICH INCREASE THE SENSITIVITY THEREOF

Barret Broyde, Lawrence Township, Mercer County, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.

Division of Ser. No. 344,790, March 26, 1973, Pat. No. 3,808,155, which is a continuation-in-part of Ser. No. 137,032, April 23, 1971, abandonec., which is a continuation of Ser. No. 764,866, Oct. 3, 1968, abandoned. This application Feb. 4, 1974, Ser. No. 439,660

Int. Cl. G03c *1/68, 1/70*

U.S. Cl. 96—115 R 6 Claims

1. An electron sensitive photoresist composition comprising a partially cyclized cis-polyisoprene resist and a compound selected from the group consisting of benzil and benzophenone, said resist and said compound being dissolved in a solvent system employed with said resist, the concentration of said compound in the photoresist-solvent system being an amount ranging from 0.1 to 5%.

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3,865,598

## PHOTOGRAPHIC SILVER HALIDE EMULSIONS

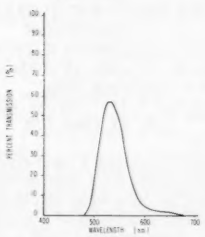
Keisuke Shiba; Masanao Hinata; Hiroyuki Amano, and Hiroshi Hara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 10, 1971, Ser. No. 197,398

Claims priority, application Japan, Nov. 11, 1970, 45-99336

Int. Cl. G03c *1/08, 1/40, 1/28, 1/30*

U.S. Cl. 96—125 12 Claims




1. In a photographic silver halide emulsion green-sensitized by at least one J-band sensitization type trimethine cyanine dye, wherein at least one of the nitrogen containing heterocyclic nuclei of said dye has, on the nitrogen atom thereof, a —RCOOH group wherein R is an alkylene group, or a sulfoalkyl group, the improvement wherein said J-band sensitization type dye is present in a binder dispersion of silver clorobromide containing a water soluble iodide in a molar ratio of 0.005–0.10, based upon silver chloride which is a component of said silver chlorobromide.

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3,865,599

## ALUMINUM OXIDE FIBERS AND THEIR PRODUCTION

Manfred Mansmann, and Ludwig Schmidt, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 18, 1972, Ser. No. 316,311

Claims priority, application Germany, Dec. 22, 1971, 2163678

Int. Cl. C04b *35/10*

U.S. Cl. 106—65 11 Claims

1. A process for the production of aluminum oxide fiber which comprises forming a solution containing a neutral or basic aluminum salt of a monobasic lower carboxylic acid, a hydrolyzed silicic acid ester or organoalkoxysilane and about 0.1 to 2 percent by weight of polyethylene oxide having a degree of polymerization of at least about 100,000 said solu-

tion having an aluminum content calculated as $Al_2O_3$ of about 8 to 18 percent by weight and an $SiO_2$ content of about 1 to 20 percent by weight on total oxides in said solution, dry spinning said solution to form a filamentary structure, and heat treating said structure at a temperature up to about 1,800°C.

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3,865,600

## SOIL CONSOLIDATION

**Leonard Louis Pearson, Slough, and Anthony Cecil Plaisted, Chalfont St. Peter, both of England, assignors to Fosroc AG, Zug, Switzerland**

**Filed Feb. 26, 1973, Ser. No. 335,971**

**Claims priority, application Great Britain, Mar. 8, 1972, 10846/72; Mar. 17, 1972, 12682/72**

**Int. Cl. C04b** *19/04*

**U.S. Cl. 106—84** **20 Claims**

**1.** A method of consolidating soil to create waterimpermeable underground barriers, said method comprising applying to the soil an aqueous solution consisting essentially of an alkali metal silicate and a water-miscible gelling agent therefor, the gelling agent having a saponification value of 503 to 580 mg. KOH/g and being a tripartite blend of the mono-, di and triacetate acid esters of glycerol, the monoacid ester being in a substantial amount to impart water miscibility to the other two esters, the di-acid ester and the tri-acid ester being present to hydrolyze the silicate, so that the tripartite blend gels substantially all the silicate to form in the soil within a reasonably short period of time, a water-impervious gel.

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3,865,601

## ADDITIVE FOR IMPROVING HYDRAULIC CEMENT COMPOSITIONS

**Frank G. Serafin, Peabody; Robert W. Previte, Lawrence, and Robert F. Stierli, Lexington, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Filed Oct. 5, 1973, Ser. No. 403,963**

**Int. Cl. C04b** *7/56*

**U.S. Cl. 106—95** **7 Claims**

**1.** The method of preparing a water-repellant, set-retarded hydraulic cement composition, said method comprising the steps of preparing an oil-in-water emulsion containing water and a solids portion comprised of a major proportion of a water-insoluble, water-repelling acid component selected from the group consisting of fatty acids, rosin acids and mixtures thereof, from about 3 to about 30 percent by weight of a set-retarding component for said cement and at least about 0.5 percent by weight of an emulsifier formed by reacting said acid component with a base capable of forming a salt thereof, which salt will maintain a stable emulsion, and thereafter adding said emulsion to said cement in an amount ranging between about 0.001 to about 0.3 percent by weight of solids of said emulsion based on said cement.

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3,865,602

## PROCESS FOR THE MANUFACTURE OF CEMENT CLINKER AND SULPHUR DIOXIDE

**Heinrich Stich; Walter Binder; Josef Hutter, and Helmut Marecek, all of Linz/Donau, Austria, assignors to Osterreichische Stickstoffwerke Aktiengesellschaft, Linz/Donau, Austria**

**Filed Oct. 16, 1972, Ser. No. 297,708**

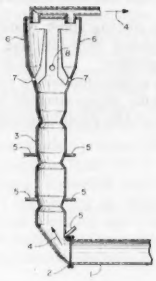
**Claims priority, application Austria, Oct. 14, 1971, 8869/71**

**Int. Cl. C04b** *7/04*

**U.S. Cl. 106—103** **1 Claim**

**1.** In a process for the manufacture of cement clinker and sulphur dioxide from calcium sulphate by the gypsum-sulphuric acid process including a calcination step in a rotary furnace and a preheating step for the crude furnace powder, prior to its introduction into the rotary furnace, in a suspension gas zone, the suspension gas zone of the preheating step being followed by a calcination zone of the calcination step, said preheating step being carried out by flue gases issuing from said furnace, the improvement comprising:

introducing into said suspension gas zone as tertiary air a portion of the air required for said gypsum-sulphuric acid process in an amount to provide an oxygen content of 0.1 to 0.5 percent by volume in the flue gases leaving said suspension gas zone, said step of introducing comprising: passing into said suspension gas zone, as a first partial



tertiary air stream, air which intrudes into a transition area between said suspension gas zone and said calcination zone at a point where the temperature of said flue gases is at least 870°C; and

introducing into said suspension gas zone the remainder of said amount of said tertiary air in at least one second partial tertiary air stream at at least one point where the temperature of said flue gases is maximally 800°C.

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3,865,603

## MODIFIED STARCH-EXTENDED GELATIN COMPOSITIONS

**Chester D. Szymanski, Martinsville, and Gerald J. Helmstetter, Somerville, both of N.J., assignors to National Starch and Chemical Corporation, New York, N.Y.**

**Filed July 17, 1972, Ser. No. 272,395**

**Int. Cl. A61k** *9/04;* **C08b** *25/02;* **C08h** *7/00*

**U.S. Cl. 106—130** **4 Claims**

**1.** An extended gelatin composition comprising 40 to 97 percent of gelatin and 3 to 60 percent, by weight, of a modified starch selected from the group consisting of:

a. fluidity starches chemically modified with monoreactive moieties having a degree of substitution at least 0.008, and

b. thermally modified starches chemically modified with monoreactive moieties to a degree of substitution of at least 0.008;

said modified starches selected from the group consisting of the succinates, alkenyl succinates, diethylaminoethyl ethers, phthalates, sulfonates, carboxymethylated and chlorinated derivatives, and being chosen so that an aqueous solution containing 30 percent, by weight, total solids comprising the chosen proportions of said modified starch and gelatin, held at a temperature of 137°F. (58°C.) for 16 hours exhibits no phase separation.

**4.** A pharmaceutical capsule shell having a wall consisting essentially of an extended gelatin composition comprising an equilibrium amount but no more than 25 percent, by weight, of water, the remainder of said composition comprising 40 to 97 percent, by weight, of gelatin, and 3 to 60 percent, by weight, of a modified starch selected from the group consisting of:

a. fluidity starches chemically modified with monoreactive moieties having a degree of substitution of at least 0.008, and

b. thermally modified starches chemically modified with monoreactive moieties to a degree of substitution of at least 0.008;

said modified starches selected from the group consisting of the succinates, alkenyl succinates, diethylaminoethyl ethers, phthalates, sulfonates, carboxymethylated and chlorinated derivatives, and being chosen so that an aqueous solution containing 30 percent, by weight, total solids comprising the chosen proportions of said modified starch and gelatin, held at a temperature of 137°F. (58°C.) for 16 hours exhibits no phase separation.

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3,865,604

## FLAME-RETARDANT REGENERATED CELLULOSE

Manfred Riedel, Binzen, Germany, and Rainer Wolf, Allschwil Basel, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Apr. 2, 1973, Ser. No. 346,722

Claims priority, application Switzerland, Apr. 6, 1972, 5028/72

Int. Cl. C08b *21/20, 27/52*

U.S. Cl. 106—168 20 Claims

1. In a process for the production of regenerated cellulose of reduced flammability, the improvement of precipitating the cellulose from a solution of cellulose, containing a reaction product of

a. at least one compound of formula I,

$$(NPCl_2)_n \qquad I$$

in which n signifies at least 3,

b. at least one compound of formula II, and

$$HO—R—OH \qquad II$$

in which R signifies a radical selected from alkylene, cycloalkylene, cycloalkyl-alkylene, alkenylene and alkynylene, which radical contains up to 12 carbon atoms and is unsubstituted or substituted

i. by 1 to 4 substituents selected from fluorine, chlorine, bromine, alkyl of 1 to 4 carbon atoms, methoxyethyl, ethoxyethyl, and mono-, di- or tri- fluoro-, chloro- or bromoalkyl of 1 to 4 carbon atoms,

ii. by 1 or 2 alkoxy or alkenyloxy radicals of 1 to 4 carbon atoms, or

iii. by 1 phenyl radical.

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3,865,605

## READILY DISPERSIBLE PIGMENTS

Ernst Spietschka, Oberauroff, and Manfred Urban, Delkenheim, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft Vormals Meister Lucius & Bruning, Frankfurt/Main, Germany

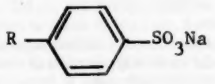
Filed Oct. 19, 1972, Ser. No. 299,132

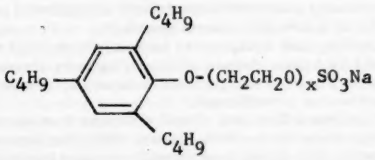
Claims priority, application Germany, Oct. 21, 1971, 2152485

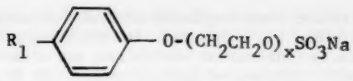
Int. Cl. C08h *17/14*

U.S. Cl. 106—288 Q 5 Claims

1. A readily dispersible quinacridone pigment composition consisting essentially of finely divided quinacridone pigment containing 1 to 10 percent by weight, based on dry weight of pigment of at least one of a surface-active agent of the formulae







wherein R is alkyl with 10 to 14 carbon atoms, $R_1$ is alkyl with 9 to 12 carbon atoms and $x$ is an integer of from 3 to 8.

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3,865,606

## PROCESS FOR THE CONTINUOUS PRODUCTION OF AQUEOUS PARAFFIN EMULSIONS

Wilhelm Neier, Homberg/Niederrhein; Hans-Jurgen Lindstadt, Rheinkamp-Repelen, and Werner Webers, Orsov, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Jan. 8, 1973, Ser. No. 322,049

Claims priority, application Germany, Jan. 11, 1972, 2201127

Int. Cl. C08h *9/08*

U.S. Cl. 106—271 13 Claims

1. Process for continuously producing an aqueous paraffin emulsion product comprising:

1. preparing a first feed mixture by mixing together water, paraffin wax, and ionic emulsifier; mixing together a recycle stream of primary emulsion from step (2) with said first feed mixture in the weight ratio of recycle primary emulsion to said first feed mixture in the range of about 1 to 200 to produce a process stream;
2. passing the process stream from (1) under conditions of turbulent flow through a first heat exchange zone at a temperature in the range of about 90° to 120°C. to produce said primary emulsion stream;
3. preparing a second feed mixture by mixing together a portion of said primary emulsion stream from (2) and a nonionic emulsifier; mixing together a recycle stream of secondary emulsion from step (4) with said second feed mixture in the weight ratio of recycle secondary emulsion stream to said second feed mixture in the range of about 1 to 200 to produce a process stream;
4. passing the process stream from (3) under conditions of turbulent flow through a second heat exchange zone at a temperature in the range of about 80° to 95°C. to produce said secondary emulsion stream whose stability is greater than that of said primary emulsion stream; and
5. separating as the product stream the uncycled portion of said secondary emulsion stream;

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3,865,607

## DEVELOPMENT OF IMAGE COPIES PROVIDED BY DIFFERENTIAL ABSORPTION OF LIQUIDS

Abram Games, London, England, assignor to Imagic Limited, London, England

Filed Jan. 9, 1973, Ser. No. 322,179

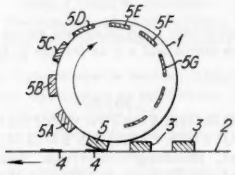
Claims priority, application Great Britain, Jan. 11, 1972, 1291/72

Int. Cl. B44d *5/04;* B41m *5/00*

U.S. Cl. 117—1.7 6 Claims

1. In a method of producing a copy of an original design carried by a surface which is such that the absorbency to a range of liquids differs either between the image and non-image areas or between contiguous image areas, or both, which comprises the steps of providing a layer of liquid from said range on said surface to form a liquid pattern on said surface corresponding to the less absorbent areas of the original design as a result of the differential absorption, contacting the liquid pattern on said surface with a transfer roller to transfer liquid in said pattern from said surface to the transfer

roller surface, transferring the liquid pattern from said transfer roller surface to a copy surface, and developing said liquid pattern, the improvement wherein said step of developing comprises contacting said liquid pattern with a dry developing agent carried by the surface of a developer roller which has the property of rapidly absorbing surface moisture after wetting by the liquid pattern to bring about the development, and then retaining this liquid, so that by the time the developer roller has made one revolution, an area of its surface which has been wetted with the liquid of said liquid pattern is dry again and ready for being re-wetted for further development either of a subsequent portion of the same liquid pattern or of a different liquid pattern.

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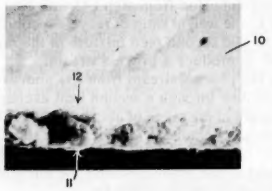
**3,865,608**

## METHOD OF COATING A DIE CAVITY SURFACE AND THE COATED SURFACE

**Alexander S. Borbely, and Jon A. Bereman, both of Indianapolis, Ind., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.**

**Filed Feb. 2, 1973, Ser. No. 328,924**
**Int. Cl. B22c** *9/12*
**U.S. Cl. 117—5.3** **20 Claims**




**1.** An article having a surface adapted to shape metal containing materials, the surface coated with a substantially continuous thin film capable of causing modification of properties of the surface of the article related to shaping of metal containing materials, the film including an oxide of a refractory metal and carbon selected from the group consisting of amorphous and crystalline allotropic forms.

**10.** A method of coating a surface of an article adapted to shape metal containing material, the method comprising the steps of applying to the surface a composition including carbon selected from the group consisting of amorphous and crystalline allotropic forms suspended in liquid and an oxide or acid of refractory metal dissolved in a hydroxide, and removing liquid from the applied composition to form a substantially continuous thin film including an oxide of refractory metal and carbon selected from the group consisting of amorphous and crystalline allotropic forms over the surface, the film capable of causing modification of properties of the surface of the article related to shaping of metal containing material.

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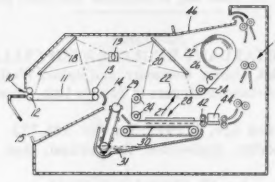
**3,865,609**

## METHOD FOR TONING A LATENT IMAGE

**Curt Robert Raschke, Warrensville Heights, Ohio, assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio**

**Filed Jan. 30, 1974, Ser. No. 437,949**
**Int. Cl. G03g** *13/08, 15/08*
**U.S. Cl. 117—17.5** **3 Claims**



**1.** The method of producing a cloud of charged toner particles, and developing an electrostatic image from the cloud, comprising the steps of:

a. establishing a base electrode in a configuration to support a quantity of pulverized particles

b. establishing a screen electrode superposed with said base electrode

c. imposing a high voltage of opposite polarity between said base and screen electrode

d. providing a supply of pulverized semi-conducting toner particles upon said base electrode, whereby the surface particles of said supply take on the polarity of said base and are thereby attracted to said screen of opposite polarity, some being neutralized by said screen to return to said supply, and others passing through said screen to circulate as a cloud above the screen; and

e. moving a carrier having an electrostatic image into superposed registration over said screen with said image immersed in said cloud to thereby attract toner to the carrier in a pattern according to the image.

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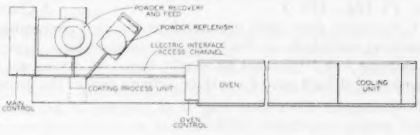
**3,865,610**

## COATING METHOD WITH PRECURE AND APPARATUS THEREFOR

**William C. Goodridge, West Haven; Donald J. Gillette, Guilford; William P. English, Bridgeport, and G. Mark Minckler, Guilford, all of Conn., assignors to Electrostatic Equipment Corporation, New Haven, Conn.**

**Filed May 24, 1972, Ser. No. 256,499**
**Int. Cl. B44d** *1/094, 1/095;* **B05b** *5/02*
**U.S. Cl. 117—17** **12 Claims**




**1.** A method for the production of a unified, adherent coating of heat-fusible material upon only a portion of a workpiece having proximate first and second zones in heat-conductive contact with one another, comprising the steps of:

a. producing a cloud of electrostatically charged solid particles of heat-fusible resinous material;

b. exposing said workpiece to said charged particles with said workpiece charged effectively opposite thereto to cause a layer of said particles to deposit upon said first and second zones thereof;

c. heating said first zone of said workpiece to a relatively high temperature above ambient while simultaneously cooling said second zone thereof to cause at least partial

fusion and coherence of said particles on said first zone while maintaining said second zone at a relatively low temperature substantially below said relatively high temperature to substantially prevent fusion and coherence of particles on said second zone to thereby facilitate removal therefrom;

d. thereafter removing from said second zone any of said particles of resinous material remaining thereon,

said simultaneous heating and cooling step producing a relatively steep temperature gradient between said first and second zones, so that the margins of said layer of particles on said first zone are relatively sharply defined.

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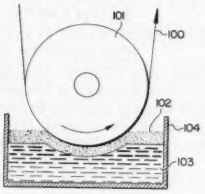
## 3,865,611
## METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY A CONDUCTIVE LIQUID ELECTRODE SURFACE

**Masamichi Sato, and Osamu Fukushima, both of Osaka, Japan, assignors to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 9, 1972, Ser. No. 305,017**
**Int. Cl. G03g** *13/08, 13/10, 15/08, 15/10*
**U.S. Cl. 117—17.5** **8 Claims**




**1.** In the process of developing an electrostatic latent image by contacting the surface of a latent image carrier with a developer therefor, locating a body of conductive liquid functioning as a liquid development electrode closely adjacent said surface, and interposing the developer between said surface and said electrode; the improvement wherein said developer contains two components, one component being toner particles and the other component being carrier particles for said toner particles, said carrier particles being formed of a material that is not wetted by said conductive liquid and having a density less than that of said conductive liquid, whereby said developer is floated on the surface of said conductive liquid.

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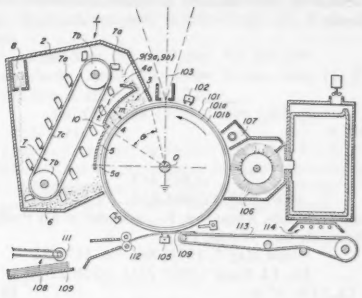
## 3,865,612
## XEROGRAPHIC DEVELOPMENT METHOD

**Seiji Jo, Tokyo, and Katsuo Makino, Dawara, both of Japan, assignors to Rank Xerox Ltd., London, England**

**Division of Ser. No. 133,656, April 13, 1971, Pat. No. 3,741,156. This application Mar. 12, 1973, Ser. No. 340,495**
**Int. Cl. G03g** *13/08*
**U.S. Cl. 117—17.5** **5 Claims**

**1.** A method for developing a latent image on a movable photosensitive surface; said method comprising the steps of forming a developer pool substantially filling a first space between a conductive wall and said photosensitive surface, contacting the photosensitive surface with developer in said pool to develop said latent image, allowing excessive developer to flow from said first space into another narrower space between an electrode and said photosensitive surface, moving said photosensitive surface in the direction of developer flow at a rate which is faster than the flow of said developer through said first space, allowing said excessive developer to



freely fall through said other space into a developer sump, and transporting developer from the sump to said first space.

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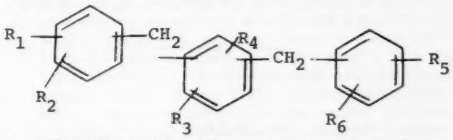
## 3,865,613
## PRESSURE-SENSITIVE COPYING SYSTEMS

**John Edward Ross, Stoke Poges; David James Marshall, Widmer End, High Wycombe, and Brian Samuel Chapman, Prestwood, all of England, assignors to Wiggins Teape Research & Development Limited, London, England**

**Filed Sept. 11, 1972, Ser. No. 287,714**
**Claims priority, application Great Britain, Sept. 23, 1971, 44474/71; Jan. 20, 1972, 2785/72**
**Int. Cl. B41m** *5/16*
**U.S. Cl. 117—36.8** **5 Claims**

**1.** A sheet for use in a pressure-sensitive copying system, comprising a base sheet carrying a coating of the microcapsules, each microcapsule containing an organic, initially colourless, colour-former, dissolved in a solvent which includes a mixture of dibenzylbenzenes of the general formula




where $R_1$ to $R_6$ are selected from the group comprising hydrogen, alkyl groups containing less than 5 carbon atoms or alkaryl groups containing 7 or 8 carbon atoms.

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## 3,865,614
## METHOD FOR COATING URANIUM IMPREGNATED GRAPHITE WITH ZIRCONIUM CARBIDE

**Ray S. Newbury, Livermore, and Geoffrey R. Tully, Jr., Alamo, both of Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Apr. 2, 1959, Ser. No. 803,810**
**Int. Cl. B44d** *5/12*
**U.S. Cl. 117—46 CA** **3 Claims**

**1.** In a process for producing a tenacious zirconium carbide coating on graphite impregnated with uranium comprising the steps of impregnating a piece of porous graphite with uranyl nitrate dihydrate dissolved in tertiary butyl alcohol, enveloping said graphite piece in clean tertiary butyl alcohol solvent to dissolve said uranyl nitrate dihydrate impregnant from the surface of said graphite into a liquid, enveloping said graphite piece in liquid nitrogen to freeze said impregnated solution, evaporating said frozen solvent therefrom, whereby said uranyl nitrate dihydrate is deposited within said graphite pores, converting said uranium to the carbide by the application of heat, outgassing said graphite, applying a coating of finely divided zirconium suspended in liquid containing a carbona-

ceous binder onto said graphite surface, evaporating said liquid and converting said zirconium to the carbide by the application of heat whereby a zirconium carbide coating is obtained.

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3,865,615

## NON-THROMBOGENIC PLASTICS

**Donald G. Manly, Allentown, Pa., assignor to Air Product and Chemicals Inc., Wayne, Pa.**

**Filed May 7, 1973, Ser. No. 357,634**

**Int. Cl. B44d** *1/092, 1/44;* **B32b** *27/06*

**U.S. Cl. 117—47 A** **15 Claims**

**1.** Non-thrombogenic plastic comprising a fluorinated polymeric plastic from the group consisting of polyolefins and polyesters having chemically bound directly thereto through amido linkages a plasminokinase.

**10.** The method of imparting antithrombogenic properties to the surface of a plastic material from the group consisting of polyolefins and polyesters which comprises fluorinating such plastic material under conditions to form associated carboxylic moieties therein and chemically binding thereto through such carboxylic moieties a plasminogen activator selected from the group consisting of urokinase and streptokinase.

**14.** The method which comprises subjecting polyethylene to a gaseous mixture containing oxygen and fluorine, said oxygen being present in a volume ratio of 0.5/1 to 20/1 to fluorine in said gaseous mixture; further reacting the obtained oxyfluorinated polyethylene with an aqueous solution of urokinase followed by fixing the thus bonded urokinase by further reaction with hexamethylene diamine.

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3,865,616

## ELECTRICAL STEEL SHEET PROVIDED WITH COATING DERIVED FROM A CARBOHYDRATE AND A METHYLOL RESIN

**Carl-Artur Akerblom, Surahammar, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Nov. 13, 1972, Ser. No. 305,682**

**Claims priority, application Sweden, Nov. 22, 1971, 14889/71**

**Int. Cl. C08b** *25/00;* **C08h** *15/02*

**U.S. Cl. 117—132 BF** **11 Claims**

**1.** An electrical steel sheet provided with a coating derived from a varnish comprising a binder and a solvent, in which the binder consists essentially of a mixture or a partially reacted mixture of a resinous product containing methylol groups and a carbohydrate material consisting essentially of a carbohydrate with a carbon chain having at the most 12 carbon atoms, said resinous product consisting essentially of at least one product selected from the group consisting of phenolic resins, melamine resins and urea resins and having the capacity to dissolve in an organic solvent consisting of a mixture of equal parts by weight of acetone and ethanol to form a solution containing 50 per cent by weight of the resinous product, which solution is capable of being diluted with at least as much water as the quantity of organic solvent without producing precipitation of the resin, in which of the total weight of the carbohydrate and the resinous product containing methylol groups, the weight of the carbohydrate is 30–70 per cent and the weight of the resinous product 70–30 per cent.

3,865,617

## METHOD OF COATING BY REDOX POLYMERIZATION

**Syozo Shimizu; Hiroshi Shinohara; Toshihito Kondou, and Norimasa Yamada, all of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, Aichi-ken, Japan**

**Filed July 17, 1972, Ser. No. 272,400**

**Claims priority, application Japan, Aug. 11, 1971, 46-60801**

**Int. Cl. B44d** *1/06;* **B32b** *15/08*

**U.S. Cl. 117—132 C** **9 Claims**

**1.** Method of coating a metal object by redox polymerization, which comprises the steps of dissolving 1–50% by weight of said solution of at least one water insoluble vinyl or divinyl monomer in an aqueous solution containing 0.5–95% of a hydrophilic organic solvent for said monomer; adjusting the pH value of the resulting solution to 0.5–5.5 by introducing an acid which is a metal ion releasing agent for the metal in said metal object to be coated; adding at least one polymerization catalyst selected from the group consisting of peroxides, perchlorates, chlorates and persulfates to said solution, to produce a film-forming solution having a temperature between −20°C. and 60°C. and forming a polymerized film of vinyl polymer on said metal object while immersing said object in said film-forming solution.

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3,865,618

## INCREASING FLAME RETARDANCE OF CELLULOSE TEXTILE WITH 1,3,7-TRIAZA-5-PHOSPHABICYCLO(3.3.1)NONANE-3,7-ICARBONITRILE

**Donald J. Daigle, New Orleans; Armand B. Pepperman, Jr., and Floyd L. Normand, both of Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed June 28, 1973, Ser. No. 374,584**

**Int. Cl. C09j** *5/18*

**U.S. Cl. 117—136** **1 Claim**

**1.** A process for imparting to a cellulosic textile the quality of flame retardancy, comprising:

a. impregnating the cellulosic textile with an aqueous solution containing about 15% by weight of a phosphine compound selected from the group consisting of 1,3,7-triaza-5-phosphabicyclo [3.3.1] nonane-3,7-dicarbonitrile, 1,3,7-triaza-5-phosphabicyclo [3.3.1] nonane-3,7-dicarbonitrile-5-oxide, and 3,7-dicyano-5-methyl-1,3,7-triaza-5-phosphabicyclo [3.3.1] nonane iodide to a weight pickup of about 80%, and

b. drying the wet impregnated textile for about 5 minutes at about 80°C to obtain a treated fabric with about 12% weight gain.

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3,865,619

## ANTI-FOGGING HYDROPHILIC RESIN COATINGS

**Horst Pennewiss, Darmstadt-Neu-Kranichstein; Hermann Plainer, and Waldemar Schleier, both of Darmstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany**

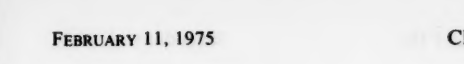
**Filed Dec. 11, 1972, Ser. No. 313,813**

**Claims priority, application Germany, Dec. 11, 1971, 2161645**

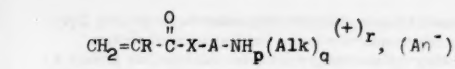
**Int. Cl. B44d** *1/09*

**U.S. Cl. 117—138.8** **7 Claims**

**1.** The method of forming an anti-fogging coating on an optical surface which comprises applying a solution of a hydrophilic film-forming resin in an aliphatic alcohol having from 1 – 4 carbon atoms to said surface to form a coating thereon and drying and hardening said coating at temperatures up to 160°C., wherein said hydrophilic resin comprises a. 12 – 30 percent of an ethylenically unsaturated polymerizable carboxylic acid having from 3 to 5 carbon atoms, or an alkali metal or ammonium salt thereof, or of a compound of the formulas



or



wherein R is hydrogen or methyl, X is oxygen or —NH, A is alkylene having 2 to 4 carbon atoms, Alk is alkyl having 1 to 18 carbon atoms, $An^-$ is one equivalent of an anion, $p = 0$, 1, or 2, $r = 0$ or 1, and $q = 2 + r - p$,

b. 40 – 88 percent of an acrylic acid ester or methacrylic acid ester of an aliphatic monoalcohol having from 1 – 4 carbon atoms or of a mixture of such alcohols, wherein a polymer or copolymer formed from the ester or ester mixture has a $T_{\lambda\ max}$-value between 30°C. and 80°C., and

c. 0 – 50 percent of a cross linking agent selected from the group consisting of (1) methylol compounds and methylol ethers of acrylamide or of methacrylamide; (2) mixtures of the compounds (1) above with an hydroxyalkyl ester of acrylic acid or methacrylic acid having from 2 – 6 carbon atoms in the hydroxy alkyl portion thereof, or with acrylamide or methacrylamide and (3) hydroxyalkyl esters as in (2) above in combination with an etherified amine-formaldehyde resin, including the step of neutralizing salt-forming groups, if they are present in component (a), with alkali metal hydroxides or ammonia if the salt-forming groups are carboxyl groups or with an acid if the salt-forming groups are tertiary or quaternary amino groups in an aminoalkyl ester component of the hydrophilic polymer, said resin, in the form of a layer from 30 to 50 microns thick swelling in water at 20°C. within three minutes to a volume 20 percent to 300 percent greater than its original volume.

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**3,865,620**

## NONWOVEN FABRICS BONDED WITH THERMOSETTING VINYL ESTER EMULSION COPOLYMERS

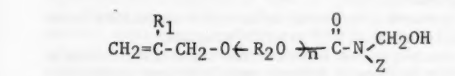
**Martin K. Lindemann, Greenville, S.C., assignor to Chas. S. Tanner Co., Greenville, S.C.**

**Division of Ser. No. 340,535, March 12, 1973, , which is a continuation-in-part of Ser. No. 142,406, May 11, 1971, abandoned. This application Jan. 4, 1974, Ser. No. 430,985**

**Int. Cl. C08g** *37/32;* **D04h** *1/64;* **D06n** *3/00*

**U.S. Cl. 117—140 A** **5 Claims**

**1.** A nonwoven fabric having the fibers thereof bonded together with an aqueous emulsion consisting essentially of an aqueous medium having colloidally suspended therein an emulsion copolymer consisting essentially of at least 85% of vinyl ester with a saturated monocarboxylic acid containing up to 18 carbon atoms, and from 0.5–15% of monomers providing thermosetting characteristics and consisting essentially of an N-methylol allyl carbamate having the formula:



in which $R_1$ is hydrogen or methyl, $R_2$ is an alkylidene group containing from 2–4 carbon atoms, and $n$ is an integer from 0–10, and Z is selected from hydrogen and $—CH_2OH$.

**3,865,621**

## TREATMENT OF FIBROUS MATERIALS

**Bryan Dobinson, and Kenneth Winterbottom, both of Cambridge, England, assignors to Ciba-Geigy AG, Basle, Switzerland**

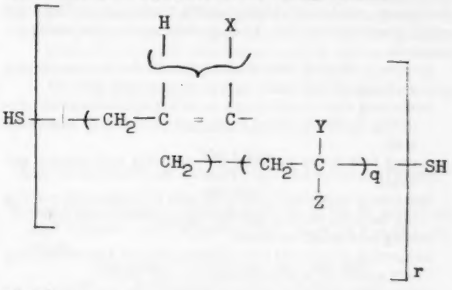
**Filed Sept. 20, 1973, Ser. No. 399,205**

**Claims priority, application Great Britain, Aug. 15, 1969, 40866/69; July 3, 1970, 32460/70**

**Int. Cl. C08h** *19/02;* **D06m** *3/02*

**U.S. Cl. 117—141** **8 Claims**

**1.** A process for rendering fibrous keratinous textile material shrink-resistant which comprises (1) applying to the material from a liquid medium about 0.5 to 15% by weight of the textile material of a polythiol of the average formula



wherein

each X and Y independently represents a substituent selected from the group consisting of hydrogen atoms and methyl groups,

Z represents a radical selected from the group consisting of —CN, —COOH, $—CONH_2$, —COOR, $—C_6H_5$, and —O-COR, where R is an alkyl group of one to eight carbon atom,

$q$ represents zero or has a value of at most 1, and

$r$ is an integer such that the average number molecular weight of the polythiol is at least 500 and at most 50,000, and (2) curing the polythiol at a temperature up to 180°C in the presence of a catalyst which is selected from the group consisting of bases, siccatives, oxidative curing agents, sulfur, mercaptobenzothiazoles, dithiocarbamates, thiuram sulfides, thioureas, organic disulfides containing not more than two sulfur atoms, alkyl xanthogen disulfides, and alkyl xanthates.

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**3,865,622**

## CARBOXYLATED ACRYLONITRILE-BUTADIENE LATEX FABRIC COATING

**Edgar A. Blair, Princeton, N.J., assignor to Princeton Polymer Laboratories, Incorporated, Plainsboro, N.J.**

**Continuation-in-part of Ser. No. 100,791, Dec. 22, 1970, abandoned. This application Dec. 26, 1972, Ser. No. 318,658**

**Int. Cl. B44d** *1/09*

**U.S. Cl. 117—161 UT** **5 Claims**

**1.** A fabric resembling leather coated on at least one surface thereof with an aqueous coating composition having a 15 to 50 weight percent of total solids, the solids comprising a mixture, in parts by weight, of carboxylated butadiene-acrylonitrile latex solids containing 25–45 parts of acrylonitrile, having a molecular weight in the range of about 1,200 to 2,000 and from 25–45 of acrylic or methacrylic acid, balance butadiene, about 37 parts, butadiene-acrylonitrile-styrene terpolymer solids, about 220 parts, curing agent, about 1 part, thickening agent, about 3 parts and pigment, about 5 parts.

**3,865,623**

## FULLY ADDITIVE PROCESS FOR MANUFACTURING PRINTED CIRCUIT BOARDS

**Herbert J. Allen, Jr., Buffalo; Ronald Earl Todd, Fair Grove, both of Mo., and Jerry Wayne Wegman, Sr., Tampa, Fla., assignors to Litton Systems Inc., Springfield, Mo., by said Allen and Todd**

**Filed Feb. 2, 1973, Ser. No. 328,913**
**Int. Cl. B44d** *1/18;* **H05k** ; **B32b** *15/00*
**U.S. Cl. 117—212** **2 Claims**

1. A fully additive process for manufacturing circuit boards having printed electrical conductors upon the top and bottom sides thereof and electrically conductive through-hole connections therebetween from a conventional board material of the group consisting of glass-epoxy, and paper-epoxy, and paper phenolic laminates, having a buttercoat, comprising the steps of:

forming a plurality of passages between the top and bottom surfaces of said board in a predetermined pattern;

immersing said circuit board in an organic solvent for rendering the finish on the buttercoat receptive to an etchant acid;

rinsing said board in water for removing said organic solvent;

immersing said board in an acid bath for chemically etching the surfaces thereof and the passages therethrough;

rinsing said board in water;

immersing said board in a caustic solution for neutralizing any traces of acid remaining on said board;

rinsing said board in an acid solution for neutralizing any traces of caustic solution remaining on said board and giving said board an acidic character;

immersing said board in an acidic tin-palladium catalyst solution for catalyzing the surfaces of said board;

rinsing said board in water to remove excess catalyst;

immersing said board in a catalyst accelerator solution whereby metal palladium ions are freed from the catalytic tin-palladium solution for subsequent attraction to copper metal;

rinsing said board in water;

drying said board;

applying a material to the top and bottom surfaces of said board in the negative facsimile of the conductor pattern to be placed upon the top and bottom surfaces of said board, said covering material comprising a heat-settable electrically insulative material which in its set state rigidly adheres to the surfaces of said board and withstands without effect immersion in an electroless copper plating solution for periods of approximately 5 hours;

heating said board for setting said thermosetting material; and

immersing said board in an electroless copper plating solution for approximately 5 hours to deposit copper on the portions of the substrate uncovered by said thermosetting material, whereby electrically conductive paths of copper are formed on the surfaces of the substrate and on the walls of the passages formed through the substrate without the necessity of etching away plated materials or stripping away masking materials.

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**3,865,624**

## INTERCONNECTION OF ELECTRICAL DEVICES

**Peter Van Dyke Wilde, Bernardsville, N.J., assignor to Bell Telephone Laboratories Inc., Murray Hill, N.J.**

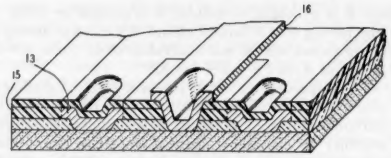
**Filed June 29, 1970, Ser. No. 50,779**
**Int. Cl. H01l** *7/00*
**U.S. Cl. 117—212** **6 Claims**

1. A method for forming a crossover interconnection pattern for a silicon integrated circuit device comprising the steps of

depositing a layer of a conductive material which can be selectively converted to an insulator over an insulator-coated monocrystalline semiconductive wafer, the layer making connection to the wafer at selected regions,

providing an insulating mask over the layer, to protect a region of the layer corresponding to a desired first conductive pattern,

exposing the masked wafer to an oxidizing atmosphere to convert the unprotected region of the layer to an oxide and to form the first conductive pattern imbedded in such oxide,




depositing a conductive layer over the still masked and imbedded conductive pattern, and

forming from said last-mentioned layer a second conductive pattern electrically isolated from the first conductive pattern and making connection to the wafer, with part of the second conductive pattern crossing over part of the first conductive pattern.

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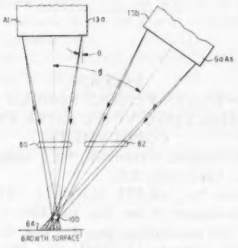
**3,865,625**

## MOLECULAR BEAM EPITAXY SHADOWING TECHNIQUE FOR FABRICATING DIELECTRIC OPTICAL WAVEGUIDES

**Alfred Yi Cho, New Providence, and Franz Karl Reinhart, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Berkeley Heights, N.J.**

**Filed Oct. 13, 1972, Ser. No. 297,239**
**Int. Cl. B44d** *1/18;* **C23c** *13/04*
**U.S. Cl. 117—212** **19 Claims**




1. A molecular beam epitaxy method of fabricating on a growth surface an epitaxial layer comprising a compound of the form $A_xB_{1-x}C$, $0 \leq x \leq 1$, where A is a first Group III(a) element, B is a second Group III(a) element and C is a Group V($a$) element, said layer having a preselected zone and laterally contiguous zones which have different refractive indexes from, and each of which are substantially lattice matched to, said preselected zone, said method comprising the steps of;

a. reducing the background pressure to a subatmospheric pressure;

b. preheating the growth surface to a temperature in the range of about 450° to 650° Centigrade;

c. directing at least two molecular beams at said surface so that said beams form an angle with one another and overlap on said surface, one of said beams comprising molecules of said first Group III($a$) element and other beams comprising molecules of said second Group III($a$) element and said Group V($a$) element; and

d. placing an obstruction in the path of said beams so that molecules in one of said beams are prevented from striking said preselected zone of said surface and so that molecules in another beam are permitted to strike said zone.

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3,865,626

## POLYESTER FILM OF HIGH STRENGTH AND LOW ELECTRICAL SURFACE RESISTANCE

**Horst Diener, Frankfort-Hoechst; Helga Lenhart, Wiesbaden, and Walter Seifried, Wiesbaden-Biebrich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt-am-Main, Germany**

**Continuation of Ser. No. 102,511, Dec. 29, 1970, abandoned, which is a continuation of Ser. No. 757,108, Sept. 3, 1968, abandoned. This application Sept. 18, 1973, Ser. No. 398,423**

**Int. Cl. C09c** *1/44;* **D02g** *3/00*

**U.S. Cl. 117—226** **4 Claims**

1. A stretched polyester film of high strength having on at least one surface thereof a binder-free, firmly adhering layer of carbon black.

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3,865,627

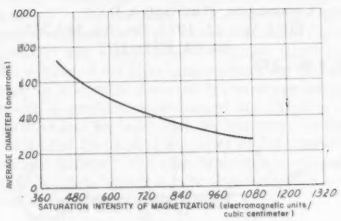
## MAGNETIC RECORDING MEDIUM INCORPORATING FINE ACICULAR IRON-BASED PARTICLES

**John S. Roden, White Bear Lake; Kent A. Kirkevold, Woodbury; Gary L. Tritle, Roseville, and Gene A. Sjerven, Saint Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed May 22, 1972, Ser. No. 255,262**

**Int. Cl. H01f** *10/02*

**U.S. Cl. 117—240** **8 Claims**




1. Magnetic recording medium exhibiting an improved signal/noise ratio comprising a magnetizable layer carried on a nonmagnetizable support, the magnetizable layer comprising a nonmagnetizable organic polymeric binder material and, uniformly thoroughly and compatibly dispersed in the binder material, fine acicular ferromagnetic particles that (1) comprise at least about 75 weight-percent metal, at least a majority by weight of the metal being iron and any other metal ingredient that comprises at least 10 weight-percent of the metal being selected from cobalt, nickel, and chromium, (2) exhibit a saturation magnetic moment of at least 75 electromagnetic units/gram, and (3) exhibit an average diameter and a saturation intensity of magnetization about equal to or less than the coordinate values for a point on the curve of FIG. 1; sufficient ferromagnetic particles being included so that the recording medium exhibits a remanent flux density greater than 1,500 gauss.

3,865,628

## REMOVAL OF POLYMER RESIDUE FROM SURFACES OF PROCESSING EQUIPMENT

**Joseph W. Callahan, Sulfur, La., and Charles A. Landry, Richmond, Va., assignors to Cesco, Inc., Houston, Tex.**

**Filed Feb. 26, 1973, Ser. No. 335,678**

**Int. Cl. C23g** *1/14*

**U.S. Cl. 134—2** **9 Claims**

1. A method for removing deposited polymer residue from equipment used in the manufacture of terephthalate polyester resins which consists essentially of:

a. contacting said polymer residue with an aqueous solution containing at least about 35% by weight potassium hydroxide, up to about 7.0% by weight of a chelating agent, and up to about 1.5% by weight of a surfactant stable in said potassium hydroxide solution at the temperature used; said aqueous solution contacting said residue at a temperature of at least about 180° F; and

b. flushing the equipment with water at a temperature of at least about 160° F.

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3,865,629

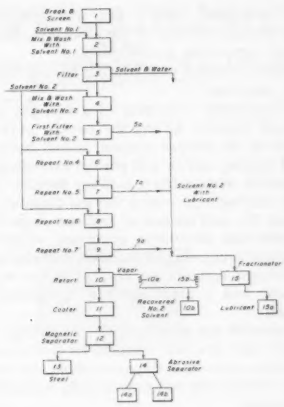
## RECLAMATION OF COMPONENTS FROM GRINDING SWARF

**Joseph Daniel Dankoff, P.O. Box 79, R. D. No. 5, and David Kent Snyder, 1167 Ridgeview Dr., both of Latrobe, Pa. 15650**

**Filed Nov. 7, 1972, Ser. No. 304,385**

**Int. Cl. B08b** *3/10;* **B03b** *7/00;* **B03c** *1/00*

**U.S. Cl. 134—19** **6 Claims**




1. In the method of recovering for reuse the steel component of grinding swarf produced where a coolant lubricant is used in the grinding process, the steps which comprise initially extracting water including the water phase of any contained coolant-lubricant compound contained in the swarf with a first solvent, and separating at least most of the solution of first solvent with the extracted water so produced thereby providing a mixture of substantially water-free steel and abrasive particles with lubricant, then in the following order mixing and washing the particles freed of the water content with a second solvent for lubricant to remove at least all but a trace of lubricant therefrom and separating the bulk of the second solvent with dissolved lubricant from the particles, heating the particles in a closed environment to vaporize any residuum of the second solvent and lubricant on the particles and removing the vapors so produced from said environment and cooling the particles, and magnetically separating the steel particles from the abrasive particles at some stage in the foregoing procedure following the removal of water, whereby the procedure following the removal of water applies to all particles until mag-

netic separation is effected and thereafter to only the steel particles.

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**3,865,630**

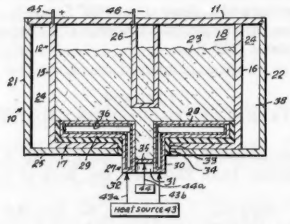
## ELECTROCHEMICAL CELL HAVING HEAT PIPE MEANS FOR INCREASING ION MOBILITY IN THE ELECTROLYTE

**Eberhart Reimers, 7700 Random Run La., No. 201, Falls Church, Va. 22042**

**Continuation-in-part of Ser. No. 106,212, Jan. 13, 1971, abandoned. This application Nov. 20, 1972, Ser. No. 307,895**

**Int. Cl. H01m** *29/01, 31/02*

**U.S. Cl. 136—86 A** **6 Claims**




1. An improved molten salt type electrochemical cell wherein the ion mobility of the electrolyte thereof is greatly increased, comprising in combination:

an electrochemical cell housing having top, bottom, and side members;

a first electrode consisting of a fuel gas permeable cup shaped member having the bottom portion thereof affixed to the interior surface of said bottom member of said housing and its wall portion extending to and affixed in sealed relationship to said top member of said housing and adapted to provide a fuel gas chamber which encompasses the wall portion of said cup shaped member;

a molten salt electrolyte contained within said fuel gas permeable cup shaped member, said electrolyte having a significant temperature responsive ion mobility characteristic and a predetermined operational temperature range;

a consumable second electrode comprising a porous fiber-metal wick structure adapted for molten salt electrolyte capillary action and disposed within said electrolyte, said second electrode being electrically isolated from said first electrode;

an electrochemically reactive fuel gas in said fuel gas chamber, said fuel gas compatible with said molten salt electrolyte and with said first and said second electrodes; and

heat transfer means spaced from said bottom portion of said fuel gas permeable cup shaped member and in contact with said electrolyte in said cup shaped member wherein said heat transfer means is a heat pipe having a selected vapor cycle, said heat pipe consisting of a closed evacuated chamber having inside wall surfaces lined with a capillary structure saturated with a volatile fluid, wherein said evacuated chamber defines an evaporator section at one end thereof and a condenser section at the other end thereof, said evaporator section end thereof is adapted for thermal energization by an external heat source, and said condenser section thereof is disposed in direct heat conductive relation with said electrolyte which is heated by said heat transfer means, said heat pipe of said heat transfer means having a selected internal pressure condition and said volatile fluid having a vaporization temperature within said operational temperature range of said molten salt electrolyte at said selected internal pressure.

**3,865,631**

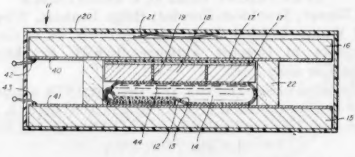
## RESERVE BATTERIES

**William Clayman, Norwalk, Conn., assignor to Charles S. Naiman, Brookline, Mass.**

**Filed Dec. 26, 1973, Ser. No. 428,340**

**Int. Cl. H01m** *21/00*

**U.S. Cl. 136—114** **10 Claims**



1. A reserve battery construction comprising,

a pouch formed of a first thin outer layer of a metallic electrode material and a second thin inner layer of a sealable plastic,

said pouch enclosing an electrolyte, means for piercing said pouch through said metal and plastic layers to release said electrolyte and activate said battery,

a second electrode,

and a porous separator between said metal layer and said second electrode whereby activation of said piercing means activates said reserve battery.

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**3,865,632**

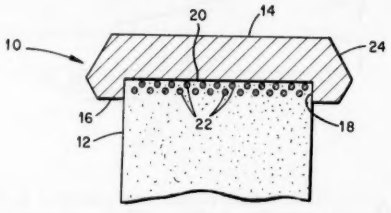
## TERMINAL FOR THERMOELECTRIC ELEMENT

**Norbert E. Elsner, La Jolla; Louis W. Perry, Jr., Rancho, Santa Fe; Michael R. Emken, Encinitas, and Elmer J. Steeger, Solana Beach, all of Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Apr. 23, 1973, Ser. No. 353,253**

**Int. Cl. H01v** *1/12*

**U.S. Cl. 136—237** **3 Claims**



1. In a thermoelectric element, the combination of:

a thermally and electrically conductive cap, said cap being generally in the form of a relatively massive disc having a conductor-engaging surface at its rim, generally parallel front and back faces, and having a relatively shallow open recess extending inwardly from and across said front face, said recess having a bottom extending generally parallel to said front face;

a plurality of layers of thermally and electrically conductive woven wire mesh screen in said recess, extending thereacross and spot welded to the bottom thereof;

and a body of thermoelectric material pressed into said recess, embedding said layers of screen and in contact with the bottom of said recess.

3,865,633

## METHODS OF MANUFACTURING SEMICONDUCTOR BODIES

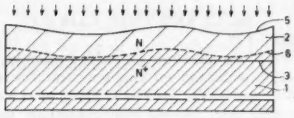
John Martin Shannon, and John Anthony Kerr, both of Salfords, near Redhill, England, assignors to U.S. Philips Corp., Briarcliff Manor, N.Y.

Filed Jan. 17, 1973, Ser. No. 324,357

Claims priority, application Great Britain, Jan. 31, 1972, 4513/72

Int. Cl. H01l 7/54

U.S. Cl. 148—1.5 7 Claims




1. A method of manufacturing an epitaxial semiconductor wafer comprising epitaxially growing on the surface of an impurity-doped portion of a semiconductor substrate an epitaxial layer of substantially uniform doping whose doping level is lower than that of the substrate portion, said epitaxial growth possibly resulting in an epitaxial layer of varjable thickness with the result that the layer surface is non-uniformly spaced from the boundary between the different doping levels in the substrate portion and layer, thereafter subjecting the whole wafer to bombardment with a beam of energetic particles which are incident at or adjacent the surface of the layer and are directed towards the boundary between the layer and the substrate, the bombardment being effected under conditions to cause internal damage of the crystal structure in the epitaxial layer adjacent the boundary over a controlled distance which extends between the vicinity of the boundary and a substantially constant depth from all parts of the surface of the layer, and maintaining the semiconductor body at a suitable elevated temperature during said bombardment to produce an enhanced out-diffusion of substrate impurities into the layer until the boundary between the layer material and the underlying more highly doped region containing out-diffused substrate impurity is relocated at positions in the layer which are at a substantially constant depth from all parts of the layer surface.

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3,865,634

## HEAT RESISTANT ALLOY FOR CARBURIZATION RESISTANCE

Donald L. Bagnoli, Oak Ridge, and Anthony R. Ciuffreda, Colonia, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 13, 1973, Ser. No. 387,946

Int. Cl. C23c 13/00

U.S. Cl. 148—6.35 3 Claims

1. The method of forming a protective scale of manganese and chromium oxide on the surface of alloy consisting essentially of manganese, chromium, iron and nickel comprising:

1. adjusting the nickel content of the alloy to the range of 36 to 38% and the manganese content of the alloy from 1.2 to 2.0%;
2. forming the alloy into a metal surface; and
3. thereafter, treating the metal surface with steam at elevated temperatures for a time sufficient to oxidize manganese and chromium present in the alloy and form a protective scale of manganese and chromium oxide.

3,865,635

## METHOD OF MAKING TUBES AND SIMILAR PRODUCTS OF A ZIRCONIUM ALLOY

Ake Sixten Boris Hofvenstam, Jarbo; Erik Thomas Andersson, and Olof Krister Kallstrom, both of Sandviken, all of Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Filed Sept. 4, 1973, Ser. No. 393,816

Claims priority, application Sweden, Sept. 5, 1972, 11435/72

Int. Cl. C22c 15/00; C22f 1/18

U.S. Cl. 148—11.5 F 4 Claims

1. In a method of making tubes and other products with improved creep strength from a zirconium alloy containing, in Wt. percent, 1.2 – 1.7 Sn, 0.07 – 0.24 Fe, 0.05 – 0.15 Cr, 0 – 0.08 Ni, 0.09 – 0.16 O, said material having $\beta$-phase respectively $\alpha$-phase structure at high respectively low temperatures, the tube or corresponding product being plastically worked to final dimension by means of hot and cold working, in which the cold working includes several steps with intermediate recrystallization annealings, the improved procedure which consists in heating the material, before the last cold working step, to the $\beta$-range and then cooling it to room temperature.

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3,865,636

## METHOD OF PROCESSING STEEL MATERIAL HAVING HIGH AUSTENITIC GRAIN-COARSENING TEMPERATURE

Akira Suzuki, Kobe; Shushi Kinoshita, and Takeshi Ueda, both of Akashi, all of Japan, assignors to Kobe Steel, Limited, Japan

Continuation-in-part of Ser. No. 134,332, April 15, 1971, Pat. No. 3,788,903. This application July 18, 1973, Ser. No. 380,460

Claims priority, application Japan, Apr. 15, 1970, 45-32078

Int. Cl. C21d 7/02, 7/14

U.S. Cl. 148—12 R 8 Claims

1. A method of processing steel material which is characterized by an abnormal grain growth curve of austenitic grain after cold working and which has a high grain coarsening temperature which comprises:

heating said cold worked steel material to a temperature of between the ferrite recrystallization temperature and the $A_1$ transformation temperature for a period of at least 5 minutes so as to effect recrystallization of the ferritic structure which had become deformed during cold working, and thereby raising the austenitic grain coarsening temperature,

further heating said steel material to a temperature within the austenitic region of from the $A_1$ transformation temperature to the austenitic grain coarsening temperature to effect austenitizing to form a non-mixed grain structure.

**3,865,637**

## PROCESS OF MAKING COLD REDUCED STEEL

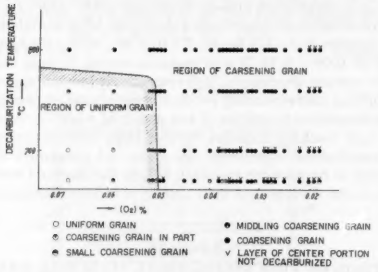
**Kazuo Matusdo; Takayoshi Shimomura, and Kooichi Oosawa, all of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha Chiyoda-ku, Tokyo, Japan**

**Filed Jan. 25, 1971, Ser. No. 109,446**

**Claims priority, application Japan, Feb. 2, 1970, 45-8451**

**Int. Cl. C21d** *9/48*

**U.S. Cl. 148—12.1** **4 Claims**




1. An improved process of making cold reduced steel consisting in producing low carbon rimmed steel of 0.03 to 0.06% C and 0.05 to 0.10% 0, decarburizing said steel at less than 780°C, cold-reducing said steel, finally annealing said cold-reduced steel at less than $A_3$ point to more than recrystallization temperature and then temper-rolling said steel.

**3,865,638**

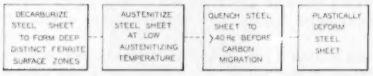
## PLASTICALLY DEFORMED HARDENED STEEL PARTS AND METHOD OF FORMING SAME

**David B. Ballantyne, Southfield; Edward R. Mantel, Warren, and George H. Robinson, Rochester, all of Mich., assignors to General Motors Corp., Detroit, Mich.**

**Filed Nov. 23, 1973, Ser. No. 418,249**

**Int. Cl. C21d** *3/04, 9/46*

**U.S. Cl. 148—12.1** **6 Claims**


DECARBURIZE STEEL SHEET TO FORM DEEP DISTINCT FERRITE SURFACE ZONES
AUSTENITIZE STEEL SHEET AT LOW AUSTENITIZING TEMPERATURE
QUENCH STEEL SHEET TO >40 Rc BEFORE CARBON MIGRATION
PLASTICALLY DEFORM STEEL SHEET

1. A method of making plastically deformed metal parts from through hardened steel sheet stock comprising the steps of:

decarburizing both major surfaces of a through hardening steel sheet about 0.01 inch – 0.08 inch in thickness to produce a sharply defined zone of ferrite on each of said sheet major surfaces, with an abrupt change in carbon concentration to an undecarburized central core of through hardening steel therebetween,

continuing said decarburization until said ferrite zones expand in thickness to about 5 percent – 20 percent of the thickness of said sheet, while maintaining at least the outer 90 percent of the outer thickness of said zones at a carbon concentration below about 0.01 percent by weight,

austenitizing said sheet without inducing migration of carbon from said central core into said decarburized zones that significantly alters said abrupt change in carbon concentration,

rapidly cooling said austenitized decarburized sheet to through harden said central core to a hardness of at least about 40 Rc before migration of carbon from said central core into said decarburized zones can significantly alter said abrupt change in carbon content between said ferrite zones and said central core, and

plastically deforming said sheet into a desired shape.

**3,865,639**

## METHOD OF MANUFACTURE IMPROVING THE BEHAVIOUR OF WELDED HEAT-RESISTANT STEEL PARTS

**Jean Bellot, Pompey; Michel Hugo, Custines; Jacques Thuillier, Pont de L'Arche, and Roger Hubert, Rouen, all of France, assignors to Societe Des Acieries Du Manoir-Pompey, Neuilly S/Seine, France**

**Filed Feb. 8, 1973, Ser. No. 330,635**

**Claims priority, application France, Dec. 15, 1972, 72.44814**

**Int. Cl. B32b** *15/18;* **C21d** *9/50*

**U.S. Cl. 148—127** **8 Claims**

1. Method of manufacturing a welded assembly the welded parts of which withstand working temperatures ranging from about 900°C. to 1050°C, said parts being of at least one high alloy-austenitic steel alloyed with chromium, nickel and/or cobalt and containing less than 60 percent by weight iron and up to 0.5 percent by weight carbon with small concentrations of additional elements such as manganese and silicon, wherein said parts are submitted to welding, said welding resulting in the formation of at least a weld seam comprising a solidification front corresponding to a physical and chemical discontinuity in said seam, said welded seam being also of said high alloy austenitic steel, and then causing the said solidification front to become chemically homogeneous, causing the carbides of said welded seam to be in the precipitated state at a maximum extent and according to a fine uniform distribution, and causing the resistance to creep rupture and the tensile strength of said weld seam to increase to values at least approximately equal to those of the welded parts all by submitting at least said seam and the adjacent areas of the welded parts to a homogenization heat treatment at a temperature between about 110°C to 1200°C during a period of time of from several minutes to several hours, thereafter subjecting at least said seam and said adjacent areas to a cooling down to about 800°C. with a temperature decrease speed of about 100°C/hr and then to an air cooling down to room temperature.

**3,865,640**

## METHOD FOR THERMAL TREATMENT OF RINGS CONSISTING OF WIRE OR STRIP MATERIAL

**Hans Eberhard Mobius, Michael - Tritz- Str.4, 6622 Wadgassen; Jakob Kubini, Danziger Str. 66, and Sorayapour Soraya, Nordring 75, both of 662 Volklingen, all of Germany**

**Filed Nov. 27, 1972, Ser. No. 309,748**

**Claims priority, application Germany, Nov. 25, 1971, 2158459**

**Int. Cl. C21d** *1/04*

**U.S. Cl. 148—12.9** **6 Claims**


METHOD OF THERMAL TREATMENT OF WIRE AND STRIP MATERIALS WOUND INTO RINGS
AUSTENITIZE AT ABOUT 850° to 900° C
STEELHARDENING IN A FLUID FLOW DIRECTED THROUGH THE RINGS IN RADIAL DIRECTION AT ABOUT 1.000 m³ q.h WITH A HARDNESS SCATTER BETWEEN 600 to 550 kp/mm² AND WITH INDUCED OSCILLATIONS OF 3 mm AMPLITUDE AT 25 CYCLES FREQUENCY
TEMPERING TO A TENSILE STRENGTH OF ABOUT 85 kp/mm²

1. Method of uniform thermal treatment of a plurality of rings of wire or strip material including heavy rings and in bunches weighing up to 1.000 kgs or more comprising the steps of exposing the rings to a fluid medium, and inducing in the article to be treated directional oscillations of natural frequencies of said rings to vary the locations of the adjacent rings and provide openings between them, while they are

subjected to a heat-exchange fluid medium to circulate through the said openings.

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### 3,865,641
### COMPOSITIONS FOR USE IN SOLDERING STAINLESS STEELS

**Lester Aronberg, Chicago, Ill., assignor to Lake Chemical Company, Chicago, Ill.**

**Filed Jan. 14, 1972, Ser. No. 217,832**
**Int. Cl. B23k** *35/24*
**U.S. Cl. 148—23** **15 Claims**

1. A soldering compsotion for use in soldering stainless steels consisting essentially of an intimate mixture of from about 95 to about 98 percent, by weight, of a solder in particulate form for use in soldering stainless steels and from about 5 to about 2 percent, by weight, of an inhibiting agent effective to inhibit the action of a phosphorous-containing acid used in soldering stainless steels.

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### 3,865,642
### WATER BASED QUENCHING COMPOSITION AND METHOD

**Robert W. Foreman, Bloomfield Hills, Mich., assignor to Park Chemical Co., Detroit, Mich.**

**Continuation-in-part of Ser. No. 156,037, June 23, 1971, abandoned. This application May 2, 1973, Ser. No. 356,625**
**Int. Cl. B23k** *35/24*
**U.S. Cl. 148—28** **3 Claims**

1. A water based quenching composition consisting essentially of in weight percent:

a. about 0.02 to 2.7 percent water soluble polyvinyl alcohol resin,

b. about 0.01 to 1.8 percent solid water soluble polyoxyalkylene compound having a molecular weight from about 1,000 to less than 95,000,

c. at least about 0.01 up to about 5 percent coupling agent for preventing separation between components (a) and (b), said coupling agent having a molecular weight of less than 900 and being different than components (a) and (b) and being selected from at least one material of the group consisting of ethylene glycol, ethyl butyl cellosolve, diethylene glycol ethyl ether, carbitol, propylene glycol, and dipropylene glycol,

and the balance water,

said composition having a percent total non-volatile solids of less than 5 percent by weight of the composition.

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### 3,865,643
### DEEP DRAWING SHEET STEEL

**John W. Bales, Jr., North Huntingdon Twsp., and Michael A. Orehoski, Duquesne, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 285,401, Aug. 31, 1972, Pat. No. 3,754,591, which is a continuation-in-part of Ser. No. 118,498, Feb. 24, 1971, abandoned, which is a continuation-in-part of Ser. No. 49,189, June 23, 1970, abandoned. This application Apr. 19, 1973, Ser. No. 352,785**
**Int. Cl. C22c** *29/00*
**U.S. Cl. 148—36** **1 Claim**

1. A deep drawing cold rolled sheet steel produced from a rim stabilized steel ingot formed by a process consisting of teeming a rimming-type steel into an ingot mold, interrupting the teeming when said mold is from about 80 to 95 percent full for a time period sufficient to allow from ½ to 15 minutes of rimming action in the ingot mold, thereafter recommence teeming the rimming-type steel into the ingot mold, and after teeming is recommenced following the rimming action, adding about ¼ to 5 pounds of molten aluminum per ton of steel to the ingot mold at a rate sufficient to permit addition of all aluminum prior to completion of the recommenced teeming step, said cold rolled sheet steel characterized by an absence of porosity and exceptional press performance characteristics typically exhibiting less than 10 percent breakage when 20-gage sheet is deep-reverse-drawn to a depth of 7 inches on a 5-inch diameter cup.

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### 3,865,644
### HIGH STRENGTH, CORROSION RESISTANT, AUSTENITE-FERRITE STAINLESS STEEL

**Lars Ivar Hellner; Hans Elof Johansson, both of Karlskoga, and Lars-Ake Norstrom, Hagfors, all of Sweden, assignors to AB Bofors, Bofors, Sweden**

**Filed Apr. 9, 1973, Ser. No. 349,359**
**Claims priority, application Sweden, Apr. 24, 1972, 5353/72**
**Int. Cl. C22c** *39/14, 39/26*
**U.S. Cl. 148—37** **6 Claims**

1. A corrosion-resistant, austenite-ferritic steel which contains 10% to 35% by volume of austenite, said steel being adapted to attain an increase in strength by age-hardening, while retaining good ductility and notch-impact resistance as well as excellent resistance to intercrystalline corrosion, said steel consisting essentially of the following composition by weight:

C, a maximum of 0.15%
Si, a maximum of 2%
Mn, a maximum of 5%
Cr, from 20% to 30%
Ni, from 4% to 9%
Mo, from 1% to 3%
Nb, from 0.1% to 2.5%
Ti, a maximum of 1.5%
Al, from 0.1% to 2%, and
N, a maximum of 0.15%,

the remainder of said composition constituting iron and impurities, the atomic percentage of Nb plus the atomic percentage of Ti in said steel composition being equal to or greater than the atomic percentage of C plus the atomic percentage of N.

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### 3,865,645
### COLD-ROLLED STEEL SHEET FOR PRESS-FORMING

**Nobuyuki Takahashi; Kenitiro Suemune; Shuji Nagata, and Tatumi Tomozoe, all of Kitakyushu, Japan, assignors to Nippon Steel Corp., Tokyo, Japan**

**Filed Dec. 27, 1972, Ser. No. 319,017**
**Claims priority, application Japan, Dec. 27, 1971, 46-10537**
**Int. Cl. C22c** *41/02;* **C21d** *9/48*
**U.S. Cl. 148—142** **5 Claims**

1. A process for preparing a cold-rolled steel sheet for a press forming, which process comprises heating a cold-rolled steel sheet consisting essentially of

less than 0.08 wt. percent carbon
0.05 to 0.4 wt. percent manganese
0.015 to 0.10 wt. percent silicon
0.003 to 0.015 wt. percent nitrogen
0.01 to 0.10 wt. percent acid-soluble aluminum the
remainder being iron and unavoidable impurities, to a temperature in a range from 680° to 900°C and holding the same at this temperature for less than 10 minutes, subsequently cooling the steel sheet from the said temperature with a cooling rate of 5 to 54°C/sec. to the temperature of an overaging treatment, then subjecting the steel sheet to said overaging treatment, in which the steel sheet is held at a temperature of 300 to 500°C for less than 10 minutes and thereafter subjecting the steel sheet to a continuous annealing treatment, in which the steel sheet is quenched to room temperature.

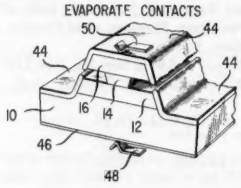
## 3,865,646
## DIELECTRIC OPTICAL WAVEGUIDES AND TECHNIQUE FOR FABRICATING SAME

**Ralph Andre Logan, Morristown; Bertram Schwartz, Westfield; Joseph Charles Tracy, Jr., Bernardsville, and William Wiegmann, Middlesex, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Division of Ser. No. 291,937, Sept. 25, 1972, Pat. No. 3,833,435. This application Dec. 26, 1973, Ser. No. 427,915**

**Int. Cl. H01l** *7/38, 7/36*

**U.S. Cl. 148—171** **9 Claims**




1. A method of fabricating a dielectric waveguide comprising the steps of:

a. epitaxially growing a GaAs-AlGaAs heterostructure in which light is to be guided;

b. forming a native oxide layer on a major surface of said heterostructure,

c. removing from said major surface selected portions of said oxide layer thereby forming from the remaining portions of said oxide layer a mask having a predetermined shape;

d. forming a mesa from said heterostructure by bringing same into contact with a bromine methanol solution containing approximately 0.05 to 0.1 percent bromine by volume, thereby etching away at a relatively slow rate those portions of said heterostructure not covered by said mask, said solution being effective to form optically flat surfaces on opposite side walls of said mesa; and

e. bringing a solution of AlGaAs into contact with the top surface and side walls of said mesa and growing thereon by liquid phase epitaxy an AlGaAs layer, said mask formed from said native oxide layer serving to protect the surface thereunder from being dissolved in said solution.

## 3,865,647
## METHOD FOR PRECIPITATION OF SEMICONDUCTOR MATERIAL

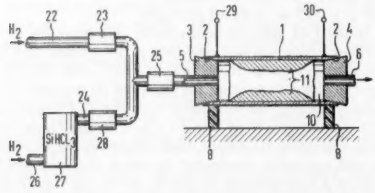
**Konrad Reuschel, Vaterstetten, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation-in-part of Ser. No. 167,137, July 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 108,725, Jan. 22, 1971, abandoned. This application Apr. 5, 1973, Ser. No. 348,259**

**Claims priority, application Germany, Sept. 30, 1970, 2048155**

**Int. Cl. H01l** *7/36*

**U.S. Cl. 148—175** **11 Claims**




1. A method of producing highly pure semiconductor material through the reaction of a gaseous compound having the same semiconductor material as a carrier body in the form of a semiconductor tube and a reduction gas, including the steps of: heating said carrier body to a temperature sufficient to cause precipitation of said semiconductor material; introducing said gaseous compound and said reduction gas into said tube, said tube being sealed against the outside atmosphere and functioning as a carrier body; and precipitating said semiconductor material on the interior of said tube by the continued application of heat until at least a portion of said tube is caused to melt together with the precipitated semiconductor material.

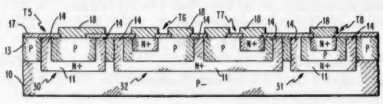
## 3,865,648
## METHOD OF MAKING A COMMON EMITTER TRANSISTOR INTEGRATED CIRCUIT STRUCTURE

**Paul P. Castrucci, Poughkeepsie; Edward G. Grochowski, Wappingers Falls; William D. North, Poughkeepsie, and Thomas L. Palfi, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 216,312, Jan. 7, 1972, Pat. No. 3,801,836, which is a division of Ser. No. 842,195, July 16, 1969, Pat. No. 3,648,130. This application Dec. 10, 1973, Ser. No. 425,754**

**Int. Cl. H01l** *7/36, 29/72;* **B01j** *17/00*

**U.S. Cl. 148—175** **2 Claims**




1. A method of forming a planar integrated circuit semiconductor common emitter transistor structure comprisirg:

forming by selective diffusion through one surface of a substrate of one type conductivity, a plurality of regions of opposite type conductivity in said substrate extending inwardly from said surface;

forming by epitaxial deposition on said surface a layer of semiconductor material of said one type conductivity, thereby burying the regions of opposite type conductivity;

forming by selective diffusion through the outer surface of the epitaxial layer at least one circumscribing region of said opposite type conductivity in the epitaxial layer extending from the outer surface to contact each of said buried regions, each of said circumscribing regions and said low resistivity buried regions enclosing at least one discrete portion of said one type conductivity layer, and at least one of said combinations of circumscribing regions and buried regions so enclosing a plurality of discrete portions, the enclosed portions forming the base regions of a transistor, and the circumscribing region together with the buried region forming the emitter of the transistor; and

forming by selective diffusion through the outer surface of the epitaxial layer, a region of said opposite type conductivity fully enclosed within each of said base regions extending from said outer surface into said base regions, said fully enclosed region being the collector of said transistor.

## 3,865,649
## FABRICATION OF MOS DEVICES AND COMPLEMENTARY BIPOLAR TRANSISTOR DEVICES IN A MONOLITHIC SUBSTRATE

**James D. Beasom, Indian Harbour Beach, Fla., assignor to Harris-Intertype Corp., Cleveland, Ohio**

**Filed Oct. 16, 1972, Ser. No. 297,700**

**Int. Cl. H01l** *7/44*

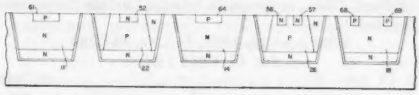
**U.S. Cl. 148—187** **20 Claims**

1. A process for the simultaneous fabrication of NPN, PNP, and MOS devices in isolated P and N type regions comprising in sequence:

diffusing to form in P type isolated regions bases of PNP's and sources and drains of N channel MOS's,

diffusing to form in N type isolated regions bases of NPN's;

diffusing to form in P type isolated regions collector



contacts of PNP's and body contacts of N channel MOS's, and to form emitters in said bases of PNP's; and

diffusing to form collector contact of NPN's, source and drain contacts of N channel MOS's, base contacts of PNP's and emitters of NPN's.

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**3,865,650**

## METHOD FOR MANUFACTURING A MOS INTEGRATED CIRCUIT

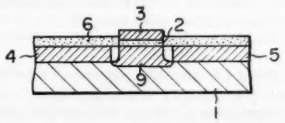
**Shigeru Arita, Ibaragi, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan**

**Filed Mar. 12, 1973, Ser. No. 340,254**

**Claims priority, application Japan, Mar. 10, 1972, 47-24912**

**Int. Cl. H01l** *7/44; B01j 17/00; H01l 11/00*

**U.S. Cl. 148—187** **4 Claims**




**1.** A method for manufacturing a MOS integrated circuit comprising the steps of:

forming at least one selected diffusion region on a silicon substrate by a dopant of a conductivity type opposite to that of said silicon substrate;

forming a double layer comprising a gate oxide layer and a gate electrode layer on said silicon substrate;

removing said double layer excluding a strip portion thereof, which serves as a gate region, in such a way that the width of strip portion remaining on said silicon substrate is equal to or smaller than the width of said diffusion region; and

diffusing a dopant into said silicon substrate by using said gate strip section as a mask, thereby forming a plurality of drain and source regions, each thereof being of a conductivity type opposite to that of said silicon substrate, on both sides of said gate strip portion; whereby at least one pair of said drain and source regions is electrically interconnected by means of said diffusion region.

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**3,865,651**

## METHOD OF MANUFACTURING SERIES GATE TYPE MATRIX CIRCUITS

**Shigeru Arita, Ibaragi, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan**

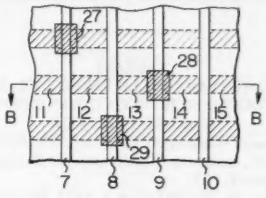
**Filed Mar. 12, 1973, Ser. No. 340,255**

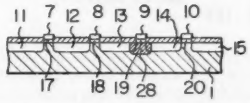
**Claims priority, application Japan, Mar. 14, 1972, 47-26256**

**Int. Cl. H01l** *7/44, 27/10;* **B01j** *17/00*

**U.S. Cl. 148—187** **3 Claims**

**1.** A method of manufacturing a series gate type matrix circuit comprising the steps of: forming at least one preliminary diffused region in a silicon substrate of one semiconductivity type, said preliminary diffused region being of the other semiconductivity type opposite to that of said silicon substrate; forming a gate oxide layer and a gate electrode layer on said silicon substrate and etching to leave a plurality of strip gate portions, at least one of said strip gate portions having a portion thereof placed on said preliminary diffused region in such a way that the width of said gate portion is equal to or smaller than the width of said diffused region; and forming on both sides of each of said strip gate portions a plurality of




diffused regions which act as a drain and source region of a MOS transistor whereby the drain and source regions of selected ones of the MOS field-effect transistors are short-circuited by said preliminary diffused region to thereby form a matrix circuit.

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**3,865,652**

## METHOD OF FORMING SELF-ALIGNED FIELD EFFECT TRANSISTOR AND CHARGE-COUPLED DEVICE

**Benjamin Agusta, Burlington; Joseph J. Chang, Shelburne, and Madhukar L. Joshi, Essex Junction, all of Vt., assignors to International Business Machines Corp., Armonk, N.Y.**

**Division of Ser. No. 257,504, May 30, 1972, abandoned. This application Oct. 5, 1973, Ser. No. 403,745**

**Int. Cl. H01l** *7/44*

**U.S. Cl. 148—187** **8 Claims**

**7.** The method of claim **6** wherein said layer of semiconductor material is rendered conductive while it is being deposited.

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**3,865,653**

## LOGIC CIRCUIT HAVING A SWITCHING TRANSISTOR AND A LOAD TRANSISTOR, IN PARTICULAR FOR A SEMICONDUCTOR STORAGE ELEMENT

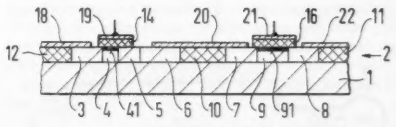
**Karl Goser, Lorenzonistrasse 66, 8000 Munich, Germany**

**Division of Ser. No. 295,583, Oct. 6, 1972, abandoned. This application Jan. 2, 1974, Ser. No. 430,097**

**Claims priority, application Germany, Oct. 12, 1971, 2150794**

**Int. Cl. H01l** *7/44*

**U.S. Cl. 148—187** **2 Claims**




**1.** A method for producing a logic circuit including a switching transistor and a load transistor in complementary channel thin layer technique connected to said switching transistor, comprising the steps of: masking a semiconductor layer of a first conductivity type which overlies a high ohmic substrate to expose zones for diffusion, diffusing an opposite conductivity material through said openings into the diffusion zones and under the edges of the openings to produce doped zones of the switching and of the load transistors, masking again by covering some of the openings and providing an additional opening

to define a further zone of the switching transistor, diffusing material of the first conductivity type through said opening and contemporaneously limiting advancement of the diffusion in one of the previously diffused zones so that a portion of the previously diffused zone remains, removing the masking, and applying electrical contacts to the diffused zones.

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**3,865,654**

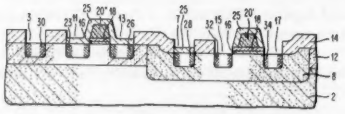
**COMPLEMENTARY FIELD EFFECT TRANSISTOR HAVING P DOPED SILICON GATES AND PROCESS FOR MAKING THE SAME**

**Chi Shih Chang, Wappingers Falls, and Teh-Sen Jen, Fishkill, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.**

**Division of Ser. No. 302,962, Nov. 1, 1972, Pat. No. 3,821,781. This application Feb. 11, 1974, Ser. No. 441,073**

**Int. Cl. H01l 7/44**

**U.S. Cl. 148—187** **9 Claims**



7. A method as in claim 5 wherein the formation of said N type source and drain regions comprise the steps of:

covering said gate electrodes and said P type source and drain regions with a thick insulation layer;

dip-etching the masking layer over the source and drain regions of the N channel device, thereby removing the masking layer over said N channel device;

diffusing an N type impurity into said N channel source and drain regions, and the gate electrodes remaining substantially intact as a diffusion mask.

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**3,865,655**

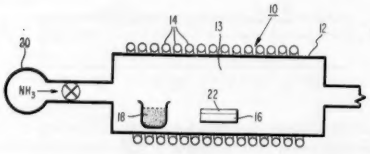
**METHOD FOR DIFFUSING IMPURITIES INTO NITRIDE SEMICONDUCTOR CRYSTALS**

**Jacques Isaac Pankove, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Sept. 24, 1973, Ser. No. 399,822**

**Int. Cl. H01l 7/44**

**U.S. Cl. 148—189** **4 Claims**



1. A method of diffusing a dopant into a nitride body comprising the steps of:

contacting the nitride body with the dopant in an ammonia atomosphere while heating said body.

**3,865,656**

**PLASTICIZED NITROCELLULOSE PROPELLANT COMPOSITION CONTAINING ALUMINUM HYDRIDE AND NITRONIUM PERCHLORATE**

**James P. Flynn; George A. Lane, and John J. Plomer, all of Midland, Mich., assignors to Adamas Carbide Corporation, Kenilworth, N.J.**

**Filed June 16, 1965, Ser. No. 465,252**

**Int. Cl. C06d 5/06**

**U.S. Cl. 149—7** **4 Claims**

1. A solid double-base propellant composition comprising on a weight basis;

a. from about 5 to about 40 percent of a crystalline substantially non-solvated aluminum hydride,

b. from about 21 to about 33 percent nitronium perchlorate, and

c. from about 30 to about 60 percent of a plasticized nitrocellulose binder.

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**3,865,657**

**A SOLID COMPOSITE PROPELLANT CONTAINING FLUOROAMINO POLYMERS**

**James P. Flynn, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 28, 1965, Ser. No. 460,619**

**Int. Cl. C06d 5/06**

**U.S. Cl. 149—19.3** **5 Claims**

1. A solid propellant composition comprising on a weight basis;

a. from about 3 to about 18 percent of a particulated solid fuel,

b. from about 1 to about 44 per cent of a particulated solid oxidizer,

c. up to about 54 per cent of a copolymer of perfluoroguanidine and formaldehyde, and

d. from about 20 to about 40 per cent of a difluoramino containing organic ester.

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**3,865,658**

**PROPELLANT COMPOSITION CONTAINING NITROCELLULOSE AND A COPOLYMER OF PERFLUOROGUANIDINE AND FORMALDEHYDE**

**James P. Flynn, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 28, 1965, Ser. No. 460,620**

**Int. Cl. C06d 5/06**

**U.S. Cl. 149—19.3** **5 Claims**

1. A solid double base propellant composition comprising on a weight basis;

a. from about 3 to about 18 per cent of a particulated solid fuel,

b. from about 1 to about 44 per cent of a particulated solid oxidizer,

c. from about 15 to about 54 per cent of a copolymer of perfluoroguanidine and formaldehyde,

d. from about 10 to about 18 per cent nitrocellulose, and

e. from about 10 to about 30 per cent of a difluoramino containing organic ester.

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**3,865,659**

**NITROCELLULOSE PROPELLANT COMPOSITION CONTAINING METAL AND TRIAMINOGUANIDINIUM HYDRAZINIUM DIAZIDE**

**James P. Flynn; George A. Lane, and John J. Plomer, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed June 16, 1965, Ser. No. 465,253**

**Int. Cl. C06d 5/06**

**U.S. Cl. 149—19.4** **5 Claims**

1. A solid double base propellant composition comprising on a weight basis

a. from about 2 to about 23 percent of a particulated solid fuel member selected from the group consisting of aluminum, beryllium, boron and mixtures thereof,
b. from about 14 to about 35 percent of a particulated solid oxidizer selected from the group consisting of ammonium perchlorate, ammonium nitrate, hydrazine nitroformate, nitronium perchlorate, cyclotrimethylenetrinitramine, cyclotetramethylenetetranitramine and mixtures thereof,
c. from about 12 to about 35 percent triaminoguanidinium hydrazinium diazide, and
d. from about 30 to about 50 percent of a plasticized nitrocellulose binder.

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**3,865,660**

## NON-TOXIC, NON-CORROSIVE, ODORLESS GAS GENERATING COMPOSITION

**Norman H. Lundstrom, Brigham City, Utah, assignor to Thiokol Chemical Corporation, Bristol, Pa.**

**Filed Mar. 12, 1973, Ser. No. 340,422**
**Int. Cl. B60r** *21/10;* **C06d** *5/06*
**U.S. Cl. 149—35** **11 Claims**

1. A gas generating composition which upon combustion yields non-toxic, odorless gases, and substantially non-corrosive, and odorless solid decomposition products; said composition consisting essentially of:
a. from 2.8 to 3.2 moles of an alkali metal azide selected from the group consisting of sodium azide, lithium azide, and potassium azide; and
b. from 0.8 to 1.2 moles of anhydrous chromic chloride.

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**3,865,661**

## PROCESS FOR MANUFACTURING A POROUS THERMOPLASTIC RESIN ARTICLE REINFORCED BY A GLASS MATT

**Akio Hata, Shinnanyo, and Hiroshi Saeki, Hikari, both of Japan, assignors to Tokuyama Sekisui Kogyo Kabushiki Kaisha, Kita-ku, Osaka-shi, Japan**

**Filed Mar. 12, 1973, Ser. No. 340,264**
**Claims priority, application Japan, Mar. 10, 1972, 47-25020**
**Int. Cl. B29c** *25/00*
**U.S. Cl. 156—79** **10 Claims**

1. A process for manufacturing a porous thermoplastic resin article reinforced by glass fibres which comprises using one or more matts of glass fibres, which have a bulk density of 0.4 $g/cm^3$ or less when compressed under the pressure of 10 $g/cm^2$, and also a bulk density of 0.6 $g/cm^3$ or less when compressed under the pressure of 1000 $g/cm^2$, and further which have an inherent property that the matts restore elastically to more than 50 percent volume of the original volume when said pressures are removed, admixing 5–70 weight parts of said matts with 95–30 weight parts of thermoplatic resin to form resin distributed matts, then heating and pressing the resin distributed matts above a temperature at which the resin is at least fused to obtain an article in which both the fibres and resin are combined into a bonded mass, thereafter maintaining the article at a temperature higher than the flowing temperature of the resin to form pores in said article by means of the restoring force of the pressed glass fibres, and finally cooling said article.

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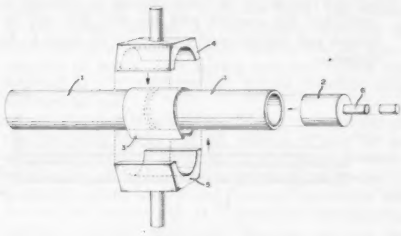
**3,865,662**

## METHOD FOR SEALING SHELL-LIKE THERMOPLASTIC OBJECTS

**Leon Segal, Morristown, N.J., assignor to Allied Chemical Corporation, New York, N.Y.**

**Filed Apr. 6, 1973, Ser. No. 348,774**
**Int. Cl. B32b** *35/00*
**U.S. Cl. 156—94** **18 Claims**

1. A method for rapidly joining or repairing shell-like thermoplastic objects comprising the steps of:
a. supporting the area on one side of the object to be treated;
b. applying a preheated reinforced thermoplastic charge in the form of a sheet, swatch, bulk charge or pellets, said



charge containing at least 5 percent fibrous reinforcement to the other side of the area to be treated; and
c. exerting a stamping pressure to the preheated charge to effect a seal.

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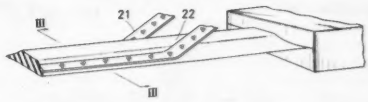
**3,865,663**

## PATTERNED RUBBER ARTICLE AND A PROCESS FOR MAKING THE SAME

**Takeshi Oka, Tokyo, Japan, assignor to Bridgestone Tire Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 132,287, April 8, 1971, abandoned. This application May 21, 1973, Ser. No. 362,079**
**Claims priority, application Japan, Apr. 11, 1970, 45-30523; Apr. 11, 1970, 45-30501; Apr. 11, 1970, 45-30524**
**Int. Cl. B29h** *21/02*
**U.S. Cl. 156—116** **1 Claim**




1. A process for manufacturing a tire having colored marks on the side wall portions thereof comprising
a. applying the colored marks as rubber paint on one side of a substantially transparent film of a thickness not exceeding 1.0 mm and made of unvulcanized synthetic rubber, unvulcanized natural rubber or a combination thereof,
b. directly contacting the thus marked side of the transparent film with the surface of the side wall portions of a tread rubber strip extruded by a tire tread extruder,
c. forming a semiprocessed tire by using said tread rubber strip with said transparent film having said colored marks directly contacted thereon and
d. vulcanizing the assembly in a vulcanizing mold to form the tire.

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**3,865,664**

## LAMINATED FOIL CANDY WRAPPER AND METHOD OF PREPARING

**Robert G. Neumann, Bellbrook, Ohio, assignor to The Specialty Papers Co., Dayton, Ohio**

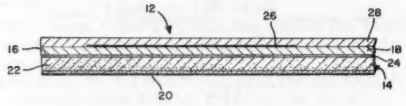
**Filed May 31, 1973, Ser. No. 365,452**
**Int. Cl. B31c** *13/00*
**U.S. Cl. 156—192** **8 Claims**

1. A method of preparing a laminated foil wrapper comprising the steps of:

coating and impregnating a continuous paper web with a fortified wax blend,

said coating and impregnating operations resulting in a wax impregnanted paper web one surface of which is waxy and the other surface of which is relatively free of wax, then

bringing a thin metal foil lamina having an adhesive coated underside into contact with the wax free side of said coated and impregnated paper web in order to form a laminate,




dampening said laminate with an aqueous plasticizing solution by passing said laminate through an atmosphere laden with said solution,

winding said dampened laminate into a roll and wrapping said roll in a moisture impervious material, and

allowing said wrapped roll to age for at least 8 hours until a moisture equilibrium is established throughout the laminate.

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**3,865,665**

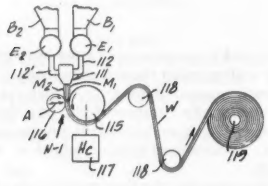
## METHOD OF PRODUCING MULTI-LAYER FLAT FILM

George J. Marion, 691 E. Boot Rd., Chester, Pa.

Continuation of Ser. No. 223,435, Feb. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 861,047, Sept. 25, 1969, abandoned, and a continuation-in-part of Ser. No. 223,436, Feb. 4, 1972, Pat. No. 3,797,987. This application Dec. 10, 1973, Ser. No. 423,470

Int. Cl. B29f *3/00*

U.S. Cl. 156—244 12 Claims




2. A method of coating a multi-layer flat film onto a substrate comprising;

co-extruding at least two thermo-extrudable materials in the form of flat non-solidified sheets in spaced-apart relatively closely adjacent overlapping position to each other, each of said sheets having its respective side edges offset from adjacent sheet side edges;

feeding a substrate for continguous contact with one of said nonsolidified sheets;

substantially simultaneously bonding adjacent face surfaces of such non-solidified sheets with one another and bonding one of the other face surfaces of one of said sheets with an adjacent face surface of said substrate; and

cooling the bonded sheets to form a solidified multi-layer flat film coating on the substrate.

**3,865,666**

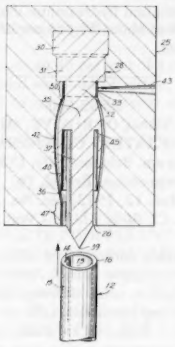
## METHOD OF MAKING A CATHETER

Suryakant R. Shoney, Cranston, R.I., assignor to International Paper Company, New York, N.Y.

Filed May 8, 1973, Ser. No. 358,309

Int. Cl. B29c *11/00*; B29d *23/02*

U.S. Cl. 156—245 13 Claims



1. The process of manufacturing a retention catheter which comprises:

a. providing an elastomeric catheter shaft having a drainage lumen extending longitudinally thereof and an inflation lumen extending longitudinally for at least a major portion thereof and communicating with the exterior of said shaft through an aperture adjacent the distal end of said shaft;

b. molding a balloon sleeve and simultaneously bonding said balloon sleeve to said shaft adjacent the distal end thereof and on one side of said aperture;

c. insert molding a tip to the distal end of said shaft;

d. providing at least one drainage eye communicating with said drainage lumen; and;

e. bonding the exposed end of said balloon sleeve to said catheter on the other side of said aperture.

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**3,865,667**

## METHOD FOR THE PRODUCTION OF SHEATH CONTAINERS

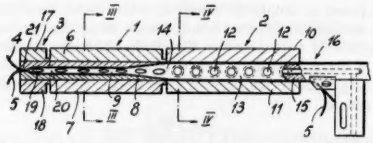
Ottavio Ferrari, Via A. Lincoln 1/A, Carpi, Italy

Filed Oct. 25, 1972, Ser. No. 300,562

Claims priority, application Italy, Oct. 25, 1971, 30263; 30264

Int. Cl. B29c *3/00*

U.S. Cl. 156—285 7 Claims




1. A method for continually producing sheath containers from thermoplastic material in form of continuous films, comprising the steps of intermittently feeding two superimposed films of thermoplastic material to a molding equipment including at least a thermowelding mold and a forming mold, thermowelding said films to define a plurality of non-welded zones extending substantially transversely to said films and a non-welded central zone extending longitudinally with respect to said films and communicating with each of said transverse

zones, and forming said sheath containers by subjecting the outer surface of said non-welded zones within said forming mold to a reduced pressure while maintaining said central longitudinal zone at a point upstream of said forming mold at a temperature less than the thermowelding temperature of said films for temporarily closing said central longitudinal zone at said point during forming of sheath containers.

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**3,865,668**

**METHOD OF MANUFACTURING PHOTO ALBUM PAGES**

**Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.**

**Filed Feb. 20, 1973, Ser. No. 334,116**
**Int. Cl. B32b** *7/14*
**U.S. Cl. 156—291** **3 Claims**

**1.** The method of manufacturing a photo album page having a paper base lamina and a clear synthetic resinous overlay extending over the surface of said base lamina, comprising the steps of: providing a base lamina of paper stock, the surface of which has substantial moisture aborptive capacity; applying an evaporable vehicle latex-based adhesive pressure sensitive to at least one surface of said base lamina in disconnected substantially circular areas such that the applied adhesive areas are substantially surrounded by uncoated surface areas of the base lamina; while said applied adhesive is still in a relatively uncured state, applying said overlay to said adhesive-coated base lamina under pressure; allowing said base lamina and attached overlay to remain relatively undisturbed at room temperature for a period of time sufficient to allow the evaporable vehicle phase of the adhesive coating to first be at least partially absorbed by said coated surface of said base lamina, and subsequently evaporated past the free edges of said overlay, prior to use.

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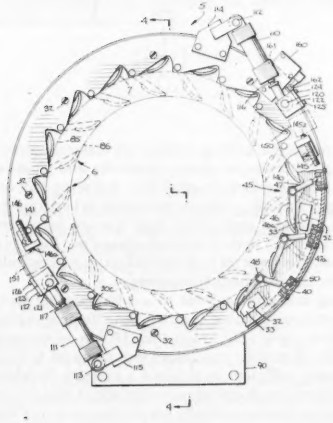
**3,865,669**

**EXPANSIBLE AND CONTRACTIBLE TRANSFER RING**

**Charles E. Todd, Detroit, Mich., assignor to Uniroyal Inc., New York, N.Y.**

**Filed Jan. 8, 1973, Ser. No. 321,740**
**Int. Cl. B29h** *17/02*
**U.S. Cl. 156—394** **13 Claims**



**1.** An expansible and contractible transfer ring for conveying a breaker-tread assembly from a building drum in a tire building machine to a tire carcass mounted on a tire shaping mechanism spaced apart from said drum, said transfer ring comprising;

a support means;

slip ring means having a central axis of rotation mounted on said support means for relative rotation therebetween;

a plurality of slip ring mounting blocks;

a plurality of slide means, individually coupling respective ones of said mounting blocks to said slip ring means in a circumferentially spaced sequence about the radially inward surface thereof, for individually selecting the circumferential spacing between each of said blocks;

a plurality of levers, each having first and second legs, disposed in a circumferentially spaced sequence about said central axis;

the first leg of each of said levers coupled to one of said slip ring mounting blocks and the junction of said firt and second legs pivotally connected to said support means;

the second leg of each of said levers being constrained to generally radially inward and outward movements relative to said central axis in response to corresponding relative rotational movements between said slip ring means and said support means, the limits of the radially inward and outward movement of each one of said second legs relative to that of each of the other second legs being determined by the relative spacing between the mounting block coupled to the respective one first leg and the other mounting blocks, said second leg of each of said levers having an inwardly directed surface for engagement with the outer surface of a tread constituting a part of a breaker-tread assembly; and

drive means interconnected between said support means and said slip ring means for effecting said relative rotation between said slip ring means and said support means.

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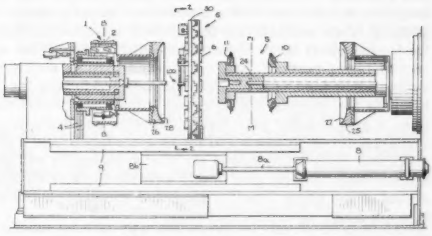
**3,865,670**

**BREAKER-TREAD ASSEMBLY TRANSFER RING SIZE CHANGING MECHANISM**

**William Charles Habert, Fraser, Mich., assignor to Uniroyal Inc., New York, N.Y.**

**Filed Dec. 29, 1972, Ser. No. 319,354**
**Int. Cl. B29h** *17/10, 17/36*
**U.S. Cl. 156—394** **14 Claims**



**1.** An expansible and contractible transfer ring for conveying a breaker-tread assembly from a building drum in a tire building machine to a tire carcass mounted on a tire shaping mechanism spaced apart from said drum, said transfer ring comprising:

support means;

annular cam means mounted on said support means for relative rotation therebetween;

a plurality of arcuate ring segments coupled to said cam means and slidably mounted on said support means in a circular arrangement having a central axis,

each of said segments being constrained to radially inward and outward movements relative to said central axis in response to corresponding relative rotational movements between said cam means and said support means and having respective radially inwardly directed surfaces for engagement with the outer surface of a tread constituting a part of a breaker-tread assembly;

drive means interconnected between said support means and said cam means for effecting said relative rotation between said cam means and said support means; and

adjustable control means coupled between said support means and said cam means for adjustably limiting the extent of said relative rotation and of the resultant radial movements of said segments.

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**3,865,671**

**LABELING DEVICE FOR UPRIGHT STANDING OBJECTS**

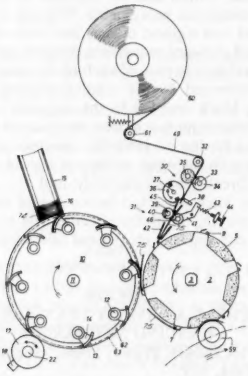
**Hermann Kronsder, Berliner Str. 10, Neutraubling, Germany**

**Filed Aug. 30, 1972, Ser. No. 284,838**

**Claims priority, application France, Sept. 10, 1971, 7132742**

**Int. Cl. B65c** *3/08*

**U.S. Cl. 156—488** **11 Claims**



**1.** A labeling machine for containers, bottles, glasses or the like comprising a label turret for applying body and shoulder labels to said containers, said label turret having first and second turret portions with means on said turret portions for gripping labels and applying the labels to a container, means for feeding sheet labels from a stack to one of said first and second turret portions, and cutting and feeding means for cutting labels from a pre-printed label tape and feeding the cut labels to the other of said first and second label turret portions, a glue transfer rotor having separate glue surfaces respectively for sheet labels and for tape cut labels, and a glue applicator roller positioned at the circumference of said glue transfer rotor to apply glue to said separate surfaces for withdrawal of the labels from the stack and applying glue to the tape cut labels carried by said turret.

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**3,865,672**

**PROCESS FOR THE REMOVAL OF VOLATILES FROM POLYMER SOLUTIONS**

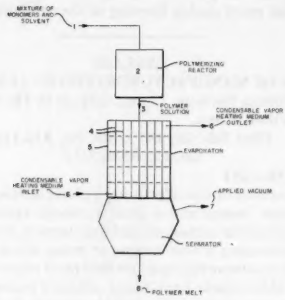
**Lothar Metzinger, Bad Duerkheim; Alfred Gottschalk, Wachenheim; Klaus Schoettle, Ludwigshafen, and Josef Schwaab, Maikammer, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Leedwigshafen/Rhine, Germany**

**Filed July 26, 1972, Ser. No. 275,360**

**Int. Cl. B01d** *1/00*; **F26b** *7/00*

**U.S. Cl. 159—47 R** **6 Claims**

**1.** A continuous single-stage process for removing volatiles from a polymer solution obtained by solution polymerization of a monomer mixture containing from 10 to 80 percent by weight of acrylonitrile or methacrylonitrile, said solution having a solids content of from 30 to 90 percent by weight, which comprises continuously conducting said solution at a temperature of from 100° to 180°C in indirect countercurrent heat exchange relationship to a fluid heating medium to progressively increase the temperature of the solution to from 200° to 350°C, maintaining a temperature gradient in said heating medium with its temperature decreasing at least 40°C from the




outlet for said solution to the inlet therefor, and continuously applying a vacuum of from 10 to 100 millimeters of mercury to the heated product to reduce the content of volatiles therein to a maximum of 2 percent by weight.

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**3,865,673**

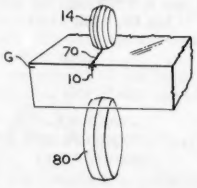
**METHOD OF PSEUDOSUBSURFACE SCORING AND CUTTING GLASS SHEETS AND SHEET CUT THEREBY**

**Robert P. DeTorre, Pittsburgh, Pa., assignor to Moline Limited, London, England**

**Continuation-in-part of Ser. No. 242,510, April 10, 1972, abandoned. This application Nov. 20, 1973, Ser. No. 417,649**

**Int. Cl. C03b** *33/00*

**U.S. Cl. 161—1** **34 Claims**




**1.** In a method of cutting a refractory material selected from the group consisting of glasses, ceramics and glass-ceramics wherein a scoring force is applied to a scoring tool on a surface of said material, relative movement is imparted between said tool and said material to form a score in said material along an intended path of cut and, thereafter, force is applied to said material to sever it along said score and intended path of cut, the improvement comprising:

applying said scoring force to a rotary scoring tool having a continuous cutting edge with an effective cutting angle of from about 150° to less than 180° in an amount and at a rate of relative movement between said tool and said material sufficient to produce a pseudosubsurface score in said material extending a substantial distance into said material and substantially perpendicular to and along said path, a substantial portion of said score along the length of its tip being spaced from the adjacent surface of the material by a microscopic zone of damaged but substantially spall- and wing-free material,

and

projecting said score deeper into the thickness of said material after said score is produced.

3,865,674

## POROUS POLYETHYLENE SHEET

Irl N. Duling, West Chester, and John C. Merges, Jr., Glen Mills, both of Pa., assignors to Sun Research and Development Co., Marcus Hook, Pa.

Continuation-in-part of Ser. No. 157,771, June 28, 1971, abandoned, which is a division of Ser. No. 885,355, Dec. 15, 1969, abandoned, which is a continuation-in-part of Ser. No. 754,884, July 18, 1968, abandoned. This application Oct. 16, 1972, Ser. No. 298,035

Int. Cl. B29d *27/08*; B32b *3/26, 27/32*

U.S. Cl. 161—6 2 Claims

1. An opaque porous sheet

consisting essentially of polyethylene having a molecular weight in excess of 500,000;

having a thickness less than about 100 mils;

said sheet when pressed receiving a permanent impression and the area receiving the impression becomes translucent.

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3,865,675

## INSULATOR PAD FOR UPHOLSTERED FURNITURE

Harmon W. Arnold, Carthage, Mo., assignor to Flex-O-Lators, Inc., Carthage, Mo.

Filed May 4, 1973, Ser. No. 357,249

Int. Cl. A47c *23/26*

U.S. Cl. 5—354 3 Claims

1. An insulator pad for upholstered furniture comprising a planar fabric sheet including:

a. a pair of generally parallel side strands each consisting of a hollow tube of flexible plastic material, and

b. a series of generally parallel, spaced apart resilient spring wires extending transversely between and knotted at their respectively opposite ends about said strands, said side strand material being of such hardness and density that if said strand were solid, it would prevent appreciable indentation thereof by said cross wires, the hollow interiors of said side strands permitting localized collapse of the walls thereof within the knots of said wires, said knots therefore appreciably indenting the exterior surfaces of said side strands.

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3,865,676

## ARTIFICIAL TREE CONSTRUCTION

George E. Bogart; Robert T. Gallagher, and Lawrence V. Lolli, all of Philadelphia, Pa., assignors to Marathon Manufacturing Company, Philadelphia, Pa.

Filed May 14, 1973, Ser. No. 359,735

Int. Cl. A47g *33/06*

U.S. Cl. 161—24 8 Claims

1. An artificial tree construction comprising a post, an upper support outstanding about said post from an upper region thereof, a lower support outstanding about said post from a lower region thereof, a plurality of elongate limb carriers arranged about said post extending obliquely between said upper and lower supports, a plurality of limbs projecting from each of said carriers, and an upper enlargement on each carrier, said upper support being formed with a larger opening for upward passage therethrough of each upper enlargement, and a smaller opening communicating with each larger opening for lateral movement of the associated carrier into the smaller opening and retention thereby against passage of the respective upper enlargement.

3,865,677

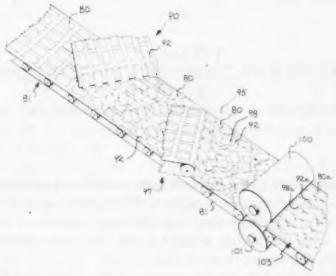
## REINFORCEMENT OF ELASTOMERIC PRODUCTS

Alfred Marzocchi, Cumberland, R.I., and Robert R. McAuslan, Seekonk, Mass., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 144,169, May 17, 1971, Pat. No. 3,741,837. This application Dec. 4, 1972, Ser. No. 312,151

Int. Cl. B32b *5/12*

U.S. Cl. 161—55 4 Claims



1. An essentially continuous sheet composed of a vulcanizable elastomeric material, said sheet being subdividable into smaller units of preselected dimension and adapted to be combined with other like pieces of preselected dimension to form, in aggregate, a vulcanizable preform for vulcanizing into a desired molded configuration, said sheet comprising:

a plurality of unitized layers of vulcanizable elastomeric material in generally face-to-face registration making up the thickness of said sheet material,

one of said layers of vulcanizable elastomeric material including embedded interiorly therein an array of separate lengths of chopped glass cords arranged in generally mutually parallel relationship and

another one of said layers of vulcanizable elastomeric material including embedded interiorly therein an array of separate lengths of chopped glass cords in generally mutually parallel relationship, said latter array of chopped lengths being angularly disposed to the array of chopped lengths in the first-mentioned layer.

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3,865,678

## SUEDE-LIKE RAISED WOVEN FABRIC AND PROCESS FOR THE PREPARATION THEREOF

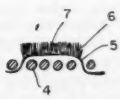
Miyoshi Okamoto, Osaka-fu; Shusuke Yoshida, Otsu; Tadashi Imai, Otsu; Tatsuo Watanabe, Otsu, and Shinzo Nishikaku, Kusatsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Mar. 7, 1973, Ser. No. 338,962

Claims priority, application Japan, Mar. 7, 1972, 47-22766; Apr. 25, 1972

Int. Cl. B29d *27/00*; D04h *1/64*

U.S. Cl. 161—67 50 Claims



1. A suede-like raised woven fabric which comprises raised fibers covering the surface of said fabric and an elastic polymer impregnated throughout said fabric, wherein said fabric is woven and comprises warp and weft yarns, the weft of said fabric being a yarn consisting of a bundle of extra fine fibers, the mono-filament denier of which is 0.0001–0.4 denier, the warps of said fabric are yarns having a coil-like crimp capacity, the total denier of said warp yarn being 50–300 denier,

and said raised fibers consisting mainly of said extra fine fibers which constitute said weft of said fabric.

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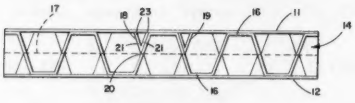
**3,865,679**
**SANDWICH PANEL HAVING CELLULAR CORE STRUCTURE WITH REINFORCING ELEMENTS**
**Jesse R. Hale, 25913 Stanford St., Hemet, Calif. 92343**
**Filed July 9, 1973, Ser. No. 377,827**
**Int. Cl. B32b** *3/12, 3/26;* **E04b** *2/28*
**U.S. Cl. 161—68** **11 Claims**




**1.** In a sandwich panel formed from a cellular core structure sandwiched between a pair of face sheets, said core structure having nodes which project in opposite directions from a midplane with the apices of said nodes abutting against said face sheets, the improvement comprising:

first reinforcing bar means running along the sides of a first row of said nodes, said bar means being bonded to the sides of the nodes of said core, the ends of said bar means being bonded to a surface of one of said face sheets, and second reinforcing bar means running along the sides of a second row of said nodes, said second reinforcing bar means being bonded to the sides of nodes of said core, the ends of said bar means being bonded to said surface of said one of said face sheets.

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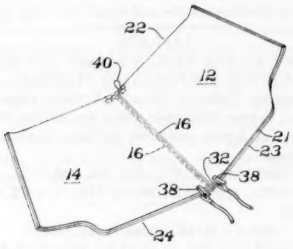
**3,865,680**
**AUTOMOBILE WINDSHIELD AND ITS METHOD OF FABRICATION**
**Thomas J. Reese, Sarver, and Harry S. Koontz, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Mar. 29, 1972, Ser. No. 239,033**
**Int. Cl. C03b** *23/02*
**U.S. Cl. 161—125** **29 Claims**




**1.** An article comprising a glass sheet having a glass sheet portion adapted to be sharply bent extending from edge to edge across a dimension of said glass sheet, a layer of electroconductive material on a surface of said sheet arranged in an electroconductive pattern comprising an elongated electroconductive portion having a given electroconductivity per unit length bonded to said glass sheet portion to be sharply bent and approximately coextensive in length therewith, and an edge portion of electroconductive material bonded to said glass sheet and extending from each end portion of said elongated electroconductive portion along an edge portion of said glass sheet, said electroconductive edge portion including a less conductive edge portion whose electroconductivity per unit length is approximately equal to that of the first named elongated electroconductive portion contacting an end portion of said first named elongated electroconductive portion and a more conductive electroconductive edge portion, whose electroconductivity per unit length is greater than that of said elongated electroconductive portion, remote from said elongated electroconductive portion, said pattern being so constructed and arranged that when electroconductive energy is applied to said electroconductive pattern to heat said electroconductive material, the temperature gradient along the edge portions of the glass in the vicinity of the end portions of said first named elongated electroconductive portion is not so steep as to cause the glass to break from thermal stress.

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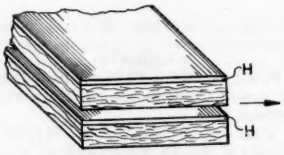
**3,865,681**
**METHOD OF PREPARING LUMBER HAVING PROPERTIES OF CLEAR GRADE LUMBER FROM COMMON GRADE LUMBER**
**Louis S. Beebe, Rt. No. 2 Foxfire Rd., Kernersville, N.C. 27284**
**Filed Oct. 12, 1972, Ser. No. 296,798**
**Int. Cl. B32b** *31/20, 21/04, 7/02*
**U.S. Cl. 156—264** **4 Claims**




**1.** A process for preparing improved lumber products from common grade lumber to meet the requirements of clear grade lumber which comprises cutting a common grade lumber piece having a thickness of about 1½ inches along a plane substantially equi-distant between its two faces to form two lumber pieces, planing each of said two lumber pieces to a thickness of ⅝ inch and adhesively laminating ⅛ inch hardboard to the face of each of said pieces to form lumber products having a thickness of substantially ¾ inch.

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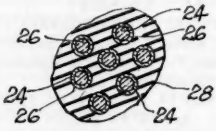
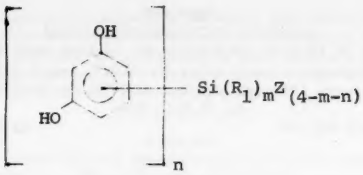
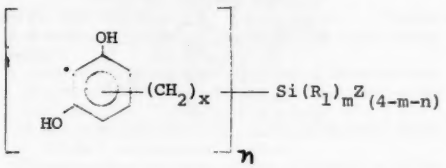
**3,865,682**
**GLASS FIBER REINFORCED ELASTOMERS**
**Alfred Marzocchi, Cumberland, R.I., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**
**Filed May 4, 1972, Ser. No. 250,303**
**Int. Cl. B32b** *5/02;* **C03c** *25/00;* **C08k** *1/14*
**U.S. Cl. 161—170** **23 Claims**




**18.** In a glass fiber-reinforced elastomeric product in which an elastomeric material constitutes a continuous phase in which bundles of glass fibers are distributed, the improvement in the bonding relationship between the glass fibers and the elastomeric material comprising a thin size coating on the individual glass fibers and an impregnant in the bundle, the impregnant comprising a blend of an elastomer and a resin prepared by reacting resorcinol and a lower aliphatic aldehyde in the presence of a primary or secondary aliphatic amine and an organo silicon compound selected from the group consisting of a resorcinolato silicon compound of the formula



and a resorcinolato silicon compound of the formula



wherein Z is a readily hydrolyzable group, R is an organic group other than resorcinol, *n* is an integer from 1 to 3, *m* is 0 or an integer from 1 to 2, and *x* is an integer from 1 to 4.

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**3,865,683**

**COVERED ASBESTOS-CEMENT PRODUCTS**

**Karl Schnee, Dornigheim; Dieter Tichy, and Friedrich Engelhardt, both of Frankfurt, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt (Main), Germany**

**Filed Sept. 12, 1972, Ser. No. 288,276**

**Claims priority, application Germany, Sept. 15, 1971, 2146101**

**Int. Cl. B32b** *13/12*; **C08g** *37/20*

**U.S. Cl. 161—205** **3 Claims**

1. A unitary product comprising an asbestos-cement base having at least one surface thereof laminated to a resin impregnated covering material with a heat and pressure cured adhesive agent, said adhesive agent comprising an aqueous solution of a mixture of a reactive polymer and an impregnating resin in a weight ratio, based on the solid contents of said adhesive agent, of 25:75 to 75:25, the resin impregnant of said covering material and the impregnating resin of said adhesive agent being at least one member selected from the group consisting of melamine-formaldehyde, urea-formaldehyde, phenol-formaldehyde, thiourea-formaldehyde resins and mixtures thereof, and said reactive polymer comprising a copolymer of

A. 20–80 percent by weight of at least one member of the group consisting of esters of acrylic and methacrylic acids with 1 to 8 carbon atom containing alkanols,

B. 0–50 percent by weight of at least one member of the group consisting of acrylonitrile, styrene, vinyl toluene, vinyl chloride and vinyl acetate,

C. 0.5–30 percent by weight of at least one olefinically unsaturated monomer selected from the group consisting of acrylamide, methacrylamide, N-methylolacrylamide, N-methylolmethacrylamide, alkyl ethers of said methylol compounds having 1 to 8 carbon atoms in the etherifying alkyl moiety, oxyethyl and oxypropyl esters of acrylic and methacrylic acid, oxyethylated semi-esters of maleic and fumaric acid, glycidylmethacrylate, allylglycidyl ether and diacetone acrylamide, and

D. 5–45 percent by weight of at least one hydrophilic monomer selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, maleic acid, fumaric acid, their alkali metal, ammonium and amine salts, dimethylaminomethacrylic acid ethyl ester, N-( -phenethyl)-2-aminoacrylic acid ethyl ester, N-( -phenethyl)-2-aminomethacrylic acid ethyl ester, N-(propionitrile)-2-aminoacrylic acid ethyl ester, N-(propionitrile)-2-aminomethacrylic acid ethyl ester, and diethylaminoethanolvinyl ether.

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**3,865,684**

**COMPOSITION FOR RECLAIMING PULP FROM WASTE PAPERS**

**C. Roy Gleason, Chicago, and Gordon A. Thomas, Wilmette, both of Ill., assignors to World-Wide Paper Reclamation, Inc., Chicago, Ill.**

**Division of Ser. No. 172,600, Aug. 17, 1971, Pat. No. 3,766,001. This application May 25, 1973, Ser. No. 364,110The portion of the term of this patent subsequent to Oct. 16, 1990, has been disclaimed.**

**Int. Cl. D21c** *5/02*

**U.S. Cl. 162—8** **6 Claims**

1. The composition for the recovery of pulp from waste papers by a process which includes the step of cooking the waste paper in an aqueous solution in which the composition is present in the dissolved state and in which the solids of the composition consist essentially of

a. an alkali metal hydroxide

b. an alkali metal carbonate

c. an alkali metal or ammonium bicarbonate

d. an alkali metal borate

and present in the ratio of 100–200 20 percent parts by weight of alkali metal hydroxide, 150–250 20 percent parts by weight alkali metal carbonate, 48 20 percent parts by weight of the bicarbonate and 56 20 percent parts by weight of the borate.

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**3,865,685**

**MULTIPLE STEP BLEACHING OF CELLULOSE WITH A PER COMPOUND AND CHLORIDE DIOXIDE**

**Gerhard Hebbel, Traisa; Horst Kruger, Darmstadt; Werner Traser, Darmstadt-Arheilgen, and Herbert Pfand, Wolfgang, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt (Main), Germany**

**Filed Apr. 16, 1973, Ser. No. 351,784**

**Claims priority, application Germany, Apr. 21, 1972, 2219504**

**Int. Cl. D21c** *9/14*, *9/16*

**U.S. Cl. 162—78** **14 Claims**

1. A plural step process in the absence of superatmospheric pressure for a chlorine-poor complete bleaching of cellulose in an aqueous medium wherein the main bleaching agent is a per compound and using as the only bleaching agents chlorine dioxide and a per compound wherein the bleaching of the cellulose consists of bleaching in a first bleaching step in water with a per compound, then in a second bleaching step in water with chlorine doxide, and then in a third bleaching step again in water with a per compound, said process having alternating per compound and chlorine dioxide steps, beginning and finishing with per compound steps, the chlorine dioxide being employed in an amount to provide not over 1 weight percent of chlorine based on the oven dried weight of the cellulose employed.

3,865,686

## METHOD OF IMPROVING THE RETENTION OF FILLER AND FIBER FINES IN PAPERMAKING PROCESSES BY USING AN ACRYLAMIDE TERPOLYMER

Myron J. Jursich, Chicago, and Gail T. Randich, Palos Heights, both of Ill., assignors to Nalco Chemical Company, Chicago, Ill.

Continuation of Ser. No. 398,418, Sept. 22, 1964, abandoned, which is a continuation-in-part of Ser. No. 205,495, June 27, 1962, abandoned. This application June 11, 1969, Ser. No. 870,161The portion of the term of this patent subsequent to June 14, 1983, has been disclaimed.

Int. Cl. D21h *3/40*

U.S. Cl. 162—168 5 Claims

1. A method of improving the retention of filler and fiber fines in the processing of paper which comprises the step of adding to an aqueous paper pulp suspension at least a retention improving dosage of an organic water-soluble terpolymer formed as the reaction product of 85.0–95.0 parts by weight of acrylamide, 0.3–2.0 parts by weight of maleic anhydride and 3-15 parts by weight of methacrylic acid.

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3,865,687

## VISCOSITY PERTURBATION DAMPER CONNECTED WITH DISTRIBUTION HEADER OF PAPERMAKING MACHINE HEADBOX

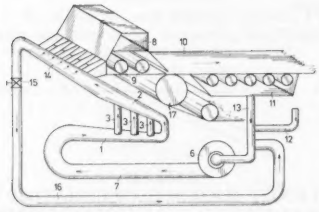
Matti Rajala, Tampere, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed Aug. 9, 1973, Ser. No. 387,133

Claims priority, application Finland, Aug. 15, 1972, 2260/72

Int. Cl. D21f *1/06*

U.S. Cl. 162—343 4 Claims



1. In a paper machine having a headbox and a branch pipe of the short circulation link leading to the headbox, means for damping fast viscosity perturbances occurring in the pulp stock flow conducted into the headbox by the multiple delay principle, said means comprising

a. a lengthy pulp stock input conduit located in connection with said branch pipe,

b. a lengthy pulp stock return conduit, running at least in its initial portion parallel with said input conduit and arranged to conduct the pulp stock into the headbox,

c. a plurality of parallel intermediate pipes spaced at a distance from each other, by which said input conduit and said return conduit are mutually connected, so that the directions of flow of the pulp stock are opposite in the parts of the input conduit and return conduit connected by said intermediate pipes, and so that the partial flows of the intermediate pipes are collected in the return conduit to form one single pulp stock flow before their conduction into the headbox.

3,865,688

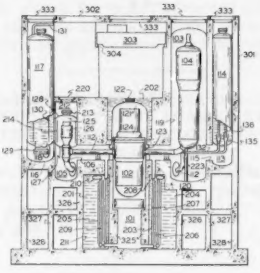
## PASSIVE CONTAINMENT SYSTEM

Frank W. Kleimola, 5008 Rimers Dr., Jackson, Mich. 49201

Continuation-in-part of Ser. No. 61,063, Aug. 5, 1970, abandoned. This application Sept. 15, 1972, Ser. No. 289,726

Int. Cl. G21c *9/00*

U.S. Cl. 176—37 22 Claims



1. A safeguard system for a nuclear reactor power plant having a reactor assembly with a reactor core including fuel therein, at least one steam generator, said steam generator having a first operative connection to said reactor assembly for the flow of a high-temperature high-pressure reactor coolant therethrough, said reactor coolant having a first pressure the magnitude of which is substantially constant during conditions of normal operation, and a containment structure sealingly enclosing at least said reactor and said steam generator, said safeguard system comprising at least one reservoir of cooling liquid disposed generally internally of said containment structure, said cooling liquid being pressurized to a second predetermined pressure the magnitude of which during conditions of normal operation is less than the magnitude of said first pressure thereby defining a first predetermined pressure differential, first conduit means for communicating between said cooling liquid and said reactor assembly, and second conduit means for communicating between said steam generator and said cooling liquid, said first conduit means being effective to supply a flow of said cooling liquid to said reactor assembly whenever there is an accidential loss of said reactor coolant causing a reduction in the magnitude of said first pressure sufficient to attain a second predetermined pressure differential as between said cooling liquid and said reactor coolant within said reactor assembly, said second predetermined pressure differential having a magnitude less than said first predetermined pressure differential, said flow of said cooling liquid being directed to said reactor core to thereby replenish said accidental loss of said reactor coolant, said second conduit means being effective when a third predetermined pressure differential is attained between said cooling liquid and the steam within said steam generator for supplying comparatively high pressure steam to said cooling liquid to thereby provide a pumping force to said cooling liquid to completely fill that portion of the reactor assembly containing the fuel of said reactor core.

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3,865,689

## METHOD OF PRODUCING CARCINOEMBRYONIC ANTIGENS

David Milton Goldenberg, Lexington, Ky., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 9, 1972, Ser. No. 305,197

Int. Cl. C12k *9/00*

U.S. Cl. 195—1.7 3 Claims

1. A method for propagating, in vitro, cells which produce carcinoembryonic antigen comprising incubating transplanted carcinoembryonic antigen producing tumor cells in a nutrient medium containing glucose, salt solutions, vitamins, amino

acids, phenol-red, antibiotics, calf serum and sodium bicarbonate and which supports the growth and propagation of said carcinoembryonic antigen producing tumor cells at a pH of from about 6.8 to 7.4 at a temperature of about 35° to 38°C. and isolating the carcinoembryonic antigen.

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3,865,690

## FERMENTATIVE PRODUCTION OF L-LEUCINE

**Shinji Okumura, Tokyo; Fumihiro Yoshinaga, Kanagawa-ken; Koji Kubota, Tokyo, and Hirotaka Kamijo, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation-in-part of Ser. No. 82,488, Oct. 20, 1970, abandoned. This application Dec. 20, 1972, Ser. No. 316,712**
**Claims priority, application Japan, Nov. 6, 1969, 44-88906**
**Int. Cl. C12d** *13/06*
**U.S. Cl. 195—28 R** **7 Claims**

1. A method of producing L-leucine by fermentation which comprises:
   a. culturing a microorganism of the genera Brevibacterium or Corynebacterium on a nutrient medium under aerobic conditions,
      1. said microorganism being capable of producing extracellular L-leucine in said medium,
      2. said medium containing sources of assimilable carbon and nitrogen and minor organic and inorganic nutrients necessary to the growth of said microorganism,
      3. said microorganism being cultured on said nutrient medium until L-leucine accumulates in said medium,
      4. said microorganism being resistant to a leucine antagonist, and
   b. recovering accumulated L-leucine from said medium.

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3,865,691

## SINGLE-CELL PROTEIN MATERIALS FROM ETHANOL

**John A. Ridgway, Jr., La Porte, Ind.; Terry A. Lappin, Naperville; Benny Moses Benjamin, Skokie, both of Ill.; Joseph B. Corns, Munster, Ind., and Cavit Akin, Naperville, Ill., assignors to Standard Oil Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 85,334, Oct. 30, 1970, abandoned. This application Apr. 30, 1973, Ser. No. 355,346**
**Int. Cl. C12c** *11/14, 11/18;* **A23l** *1/28*
**U.S. Cl. 195—49** **14 Claims**

1. An improved process for the continuous production of food-quality yeasts by aerobic growth of said yeasts in a fermentation zone on an aqueous ethanolic substrate in the presence of ammonia, an oxygen-containing gas stream, and an excess of essential macronutrient elements consisting essentially of phosphorus, potassium, magnesium, calcium and sodium and micro-nutrient elements consisting essentially of iron, manganese, zinc, molybdenum, iodine and copper, comprising the steps of:
   a. maintaining the fermentation zone at a temperature within the range from 80° to 100°F., to promote multiplication of the yeast cells by feeding on the components supplied in the aerated fermentation liquor comprising the combined aqueous ammoniacal ethanolic substrate and essential nutrient elements;
   b. continuously introducing a dispersed oxygencontaining gas stream, under superatmospheric pressure, into the combined aqueous solution to maintain an oxygen concentration in said aqueous solution within the range from 0.1 to 0.3 ppm;
   c. continuously replenishing the ethanol content of the fermentation liquor to maintain said ethanol content within the range from about 50 to about 3,000 ppm by the addition of an aqueous ethanol solution;
   d. continuously replenishing the supply of essential macronutrient elements to maintain a substantially constant concentration thereof in the fermentation liquor by the addition of an aqueous solution comprising compounds of the required macro-nutrient elements;
   e. separately replenishing the supply of micro-nutrient elements, including iron, by continuous addition of an aqueous solution comprising compounds thereof directly into the fermentation zone to maintain a substantially constant concentration thereof in the fermentation liquor;
   f. separately replenishing the supply of ammonia by continuous addition thereof in an amount required to maintain the pH of the fermentation liquor in the range from 3.5 to 5.5;
   g. continuously withdrawing from the fermentation zone a suspension of yeast cells in a portion of the fermentation liquor; and
   h. continuously withdrawing from the fermentation zone through a pressure-responsive valve an oxygen-depleted effluent gas stream.

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3,865,692

## METHOD FOR MAKING HIGHLY POTENT PLASMINOGEN

**William Homer Holleman, Libertyville, and William Wolcott Andres, Lindenhurst, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.**

**Filed Jan. 11, 1974, Ser. No. 432,789**
**Int. Cl. A61k** *19/00;* **C07g** *7/02*
**U.S. Cl. 195—66 B** **9 Claims**

1. The process of purifying plasminogen consisting essentially in preparing a solution of 0.5 – 50 mg./ml. of a plasminogen free of hepatitis agent in water buffered to a pH of 5 – 10 and containing 0.01 – 2 molar concentration of a solubility enhancer, precipitating the impurities associated with said plasminogen by adding to said solution ammonium sulfate to a molar concentration of between 0.1 and $y$ removing the formed precipitate, and precipitating the substantially pure plasminogen by adjusting the molar concentration of ammonium sulfate of the solution so obtained to a molar concentration of between $x$ and 4.0 wherein $x - y$ represents a molarity difference of at least 0.2 and $y$ is between 0.6 and 1.2.

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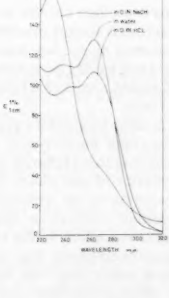
3,865,693

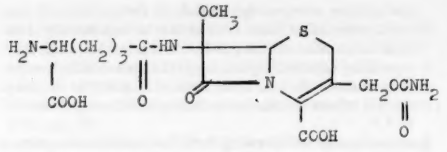
## PROCESS FOR THE PRODUCTION OF ANTIBIOTIC SUBSTANCE CEPHEMIMYCIN

**Mamoru Arai; Yashuhiro Itoh; Masaki Nakahara; Hisashi Kayamori, and Shinichi Sugawara, all of Tokyo, Japan, assignors to Sankyo Company Limitcd, Tokyo, Japan**

**Filed Aug. 16, 1973, Ser. No. 389,009**
**Claims priority, application Japan, Aug. 31, 1972, 47-87339**
**Int. Cl. C12d** *9/00*
**U.S. Cl. 195—80 R** **5 Claims**



1. A process for producing an antibiotic substance cephemimycin



which comprises cultivating *Streptomyces jumonjinensis* strain No. 3008 (NRRL 5741) in a nutrient medium and recovering the antibiotic substance from the cultured broth.

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**3,865,694**

**FERMENTATIVE PREPARATION OF L-2-AMINO-4(2-AMINOETHOXY)-BUTANOIC ACID**

**Julius Berger; David Pruess, both of Passaic, and James Parnell Scannell, North Caldwell, all of N.J., assignors to Hoffmann-LaRoche Inc., Nutley, N.J.**

**Filed Jan. 2, 1974, Ser. No. 430,335**

**Int. Cl. C12d** *13/00*

**U.S. Cl. 195—80 R** **2 Claims**

**1.** A process for preparing L-2-amino-4-(2-aminoethoxy)-butanoic acid which comprises cultivating *Streptomyces sp.* X-11085 NRRL 5331 in an aqueous nutrient medium containing assimilable sources of carbohydrates, nitrogen and inorganic salts under submerged aerobic conditions, and then recovering L-2-amino-4-(2-aminoethoxy)-butanoic acid from the aqueous medium.

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**3,865,695**

**CULTURE OF MYCELIUM**

**Pierre Massier, Ris-Orangis, France, assignor to La Societe Civile Agricole de Mycelium du Centre Quest (S.C.A.M.Y.C.O.), Benoit-la-Foret, France**

**Continuation of Ser. No. 134,829, June 25, 1971, abandoned. This application Apr. 8, 1974, Ser. No. 459,189**

**Int. Cl. C12b** *1/00*

**U.S. Cl. 195—81** **3 Claims**

**1.** A process for cultivating fungus mycelium comprising the steps of:

a. sterilizing a fungus mycelium culture medium;

b. introducing the sterilized fungus mycelium medium into a perforated transparent plastic bag together with fungus mycelium seed, said bag having perforations in an amount such that the perforation area is in a ratio to the total bag area of 1:100 to 1:300;

c. enclosing the perforated transparent plastic bag containing the fungus mycelium medium and seed in a paraffined-paper bag allowing free exchange of air between the interior and the exterior of said plastic bag while leaving a space therein containing an atmosphere compatible with fungus mycelium cultivation which will permit growth of the fungus mycelium within the plastic bag;

d. enclosing the paraffined-paper bag and the contents thereof in a strong outer bag, the bags having their mouths sealed by pleating together; and

e. storing said bags at a temperature between 17° and 26°C for a period sufficient to effect fungus mycelium proliferation in said medium, and thereafter storing said bags without opening the same at a cold location.

**3,865,696**

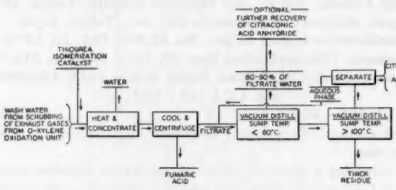
**RECOVERY OF CITRACONIC ACID ANHYDRIDE BY ISOMERIZATION AND VACUUM DISTILLATION**

**Gunther Ibing, Gladbeck, and Herbert Haferkorn, Buttrap, both of Germany, assignors to Veba-Chemie Aktiengesellschaft, Wanne Eickel, Germany**

**Continuation of Ser. No. 842,180, July 16, 1969, abandoned. This application Nov. 8, 1971, Ser. No. 196,731**

**Int. Cl. B01d** *3/36;* **C07c** *57/02*

**U.S. Cl. 203—29** **4 Claims**




**1.** Process for recovering citraconic acid anhydride from an aqueous solution containing a mixture of citraconic and maleic acids consisting essentially of:

a. isomerizing maleic acid in said solution to sparingly soluble fumaric acid and removing solid fumaric acid from the solution;

b. removing water from the solution from (a) by vacuum distilling at a sump temperature of less than 80°C leaving a concentrated solution;

c. removing a mixture of water and citraconic acid anhydride from the concentrated solution (b) by vacuum distilling at a sump temperature substantially greater than 80°C; and

d. recovering citraconic acid anhydride from the mixture from (c).

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**3,865,697**

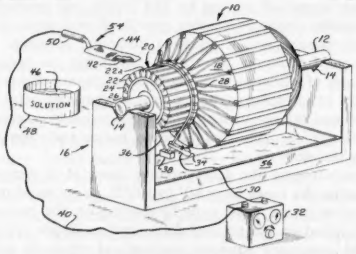
**PLATINUM PLATING PROCESS**

**Robert Suggs, 1661 Milwaukee Ave., Chicago, Ill. 60647**

**Filed May 25, 1973, Ser. No. 363,834**

**Int. Cl. C23b** *5/48, 5/24;* **B23p** *1/02*

**U.S. Cl. 204—15** **5 Claims**




**1.** A method of platinum finishing the insulation-separated commutator segments of an assembled armature which method may be conducted at room temperature, and utilizes a plating solution formed at room temperature by dissolving decomposable alkali metal acid salt and chloroplatinic acid in water, said method comprising the steps of successively shorting groups of the commutator segments of the armature to the negative side of a low voltage supply, wetting an anode connected to the positive side of said voltage supply with the plating solution and wiping the shorted commutator segments with the wet anode until a film of platinum builds up over the surface of the shorted commutator segments, the chloroplatinic acid being sufficiently diluted in the aqueous plating solution that platinum build up on the shorted segments proceeds only slowly and platinum on the insulation between the commutator segments remains sparse, the proportion of de-

composable alkali metal acid salt in the plating solution being sufficiently larger than the proportion of chloroplatinic acid therein to maintain an alkalinity level in the solution to hold the chloroplatinic acid in suspension with minimal production of platinous oxide, and the decomposed acid salt of the dried residue of the plating solution which remains on the insulation between the platinum plated segments upon evaporation of the water intermixing with and isolating the platinum content of said residue so as to avoid shorting of the platinum plated commutator segments across the insulation therebetween.

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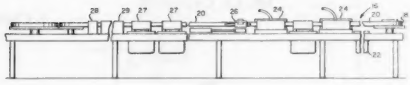
**3,865,698**
**PROCESS FOR INTERMITTENT ELECTROPLATING STRIPS**

**Leo N. Kosowsky, Sharon; Curtis N. Lovejoy, Walpole, both of Mass., and John G. Cunniff, Foster, R.I., assignors to Auric Corporation, Newark, N.J.**

**Division of Ser. No. 217,508, Jan. 13, 1972, Pat. No. 3,788,963. This application Sept. 24, 1973, Ser. No. 400,153**
**Int. Cl. C23h** *5/48, 5/58*
**U.S. Cl. 204—15** **2 Claims**



1. A process for carrying out precise electroplating of selected repeating patterns on a strip of metal by intermittently passing equal sequential lengths of the strip through an electroplating cell and to means for winding the electroplated strips onto a spool, said process comprising the steps of
   1. advancing a segment of said strip towards a winding apparatus
   2. clamping said strip in fixed position between the intermittent movements thereof, said clamping being between said winding apparatus and said electroplating cell,
   3. winding the electroplated strip during said clamping action, thereby mechanically isolating and winding movement from the portion of said strip on the electroplating cell-side of said clamping action.

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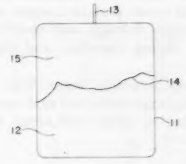
**3,865,699**
**ELECTRODEPOSITION ON NON-CONDUCTIVE SURFACES**

**Daniel Luch, Warwick, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.**

**Filed Oct. 23, 1973, Ser. No. 408,410**
**Int. Cl. C23b** *5/60;* **B44c** *1/18*
**U.S. Cl. 204—20** **29 Claims**

1. A process for metallizing comprising (1) introducing an essentially solid surface in contact with a metallic conductor into an electroplating bath from which a metal from the Group VIII of the periodic table and alloys thereof can be plated; (2) said essentially solid surface comprising an intimate mixture of an organic polymer reactive with sulfur, a carbon black and a substance from the group of sulfur and sulfur donors and having a volume resistivity of less than about 1,000 ohm-centimeters and (3) applying a potential to said surface through said metallic conductor to cause metal from said



group to deposit upon said surface in an essentially uniform manner from the locus of said metallic conductor.

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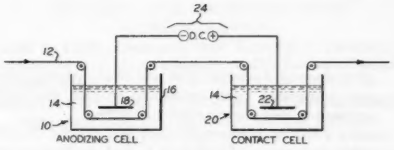
**3,865,700**
**PROCESS AND APPARATUS FOR CONTINUOUSLY ANODIZING ALUMINUM**

**Howard A. Fromson, Rogues Ridge Rd., Weston, Conn. 06880**

**Filed May 18, 1973, Ser. No. 361,720**
**Int. Cl. C23b** *5/58;* **B01k** *3/00*
**U.S. Cl. 204—28** **10 Claims**




1. In a process for continuously electrolytically anodizing aluminum, the improvement which comprises introducing anodizing direct current into said aluminum in a cathodic contact cell having therein an anode connected to said source of direct current, said aluminum having an anodized oxide coating formed thereon before entering said cell through the action of the direct current introduced in the contact cell itself.

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**3,865,701**
**METHOD FOR CONTINUOUS HIGH SPEED ELECTROPLATING OF STRIP, WIRE AND THE LIKE**

**John P. Borgmann, Naugatuck, Conn., assignor to American Chemical & Refining Company Inc., Waterbury, Conn.**

**Filed Mar. 6, 1973, Ser. No. 338,580**
**Int. Cl. C23b** *5/58, 5/68, 5/50*
**U.S. Cl. 204—28** **5 Claims**

1. In a method for the high deposition speed continuous electroplating of a workpiece with noble metal, the steps comprising

providing along a rectilinear travel path of a moving workpiece at least one electroplating chamber with an entrance and exit for said workpiece at opposite ends thereof and an anode disposed therebetween substantially parallel to said travel path; an electrical contact assembly externally of said electroplating chamber to apply an electrical potential between said workpiece and said

anode in said electroplating chamber; a rinsing station providing a rinsing chamber; and a drying station providing a plenum chamber about a drying chamber with apertures spaced about and along said path;

passing through said electroplating chamber a noble metal electroplating solution containing electrolyte and ions of the metal to be electrodeposited at a high velocity to maintain a turbulent condition therewithin; advancing a substantially continuous workpiece with a metallic surface along said travel path in contact with said electrical contact assembly, through said electroplating chamber, through said rinsing chamber, and through said drying chamber;

applying a voltage potential across said workpiece in said electrical contact assembly and said anode in said electroplating chamber to cause said metal of said solution to

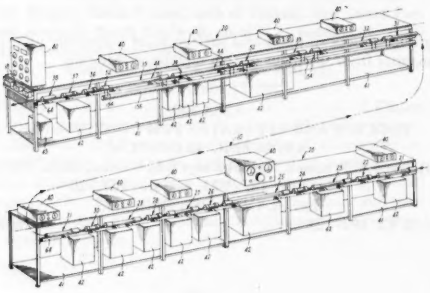

plate upon said workpiece in said electroplating chamber, said workpiece being immersed in said electroplating solution in said electroplating chamber;

passing a rinsing medium through said rinsing chamber to effect immersion of said strip in said medium to remove residual electroplating solution from the surface of said workpiece;

controlling fluid escape from the ends of at least said electroplating chamber and minimizing air interface with the noble metal electroplating solution in said electroplating chamber; and

introducing into said plenum chamber of said drying station a gas at a lineal velocity sufficient to provide high flow through the apertures into said drying chamber and directly onto substantially the entire surface of the workpiece passing therethrough to remove moisture therefrom.

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**3,865,702**

## GALVANIC NICKEL BATH FOR DEPOSITING SILK-DULL NICKEL COATS

**Waldemar Immel, Solingen, and Wennemar Strauss, Erkrath-Unterbach, both of Germany, assignors to Dr. W. Kampschulte & Cie, Solingen, Germany**

**Filed Feb. 21, 1973, Ser. No. 334,298**

**Int. Cl. C23b** *5/08, 5/46*

**U.S. Cl. 204—49** **3 Claims**

1. A galvanic aqueous, acidic bath for precipitating silk-dull nickel coats, containing active phosphoric esters in concentration of 20–80 mg/l, which are prepared by reacting the adduct of 30 mol propylene oxide and 30 mol ethylene oxide on propylene glycol with $P_2O_5$ at a mol ration of 2.5:1.

**3,865,703**

## ELECTROWINNING WITH AN ANODE HAVING A MULTICOMPONENT COATING

**Barry A. Schenker, Mayfield Heights; James M. Kolb, Mentor, and Charles R. Franks, North Madison, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Apr. 19, 1973, Ser. No. 352,417**

**Int. Cl. C22d** *1/00;* **B01k** *3/06*

**U.S. Cl. 204—105 R** **6 Claims**

1. In a process for the electrowinning of metals from aqueous acidic solutions thereof, the improvement that consists essentially of passing an electrolyzing current between a cathode and an opposed oxygen evolving anode, said anode comprising an electrically conductive supporting substrate bearing on at least a portion of the surface thereof a coating consisting essentially of from 1.0 to 10 percent antimony oxide, as $Sb_2O_3$, on a weight basis, from 30 to 90 percent $SnO_2$, from 1.0 to 50 percent of at least one platinum group metal oxide, and from 15 to 25 percent of a valve metal oxide selected from the group consisting of titanium and tantalum oxides, with the proviso that the mole ratio of tin to antimony oxides is between 95:5 and 85:15.

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**3,865,704**

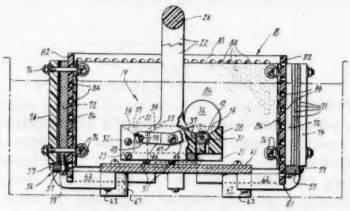
## ELECTROLYTIC ETCH APPARATUS AND METHOD

**Benjamin H. Reed, and Rexford E. Black, both of Sunnyvale, Calif.**

**Division of Ser. No. 54,491, July 13, 1970, Pat. No. 3,703,458. This application July 31, 1972, Ser. No. 276,570**

**Int. Cl. C23b** *3/04*

**U.S. Cl. 204—129.2** **6 Claims**



1. In a method for removing exposed aluminum forming a part of a continuous film disposed on an article formed of silicon, placing the articles in a phosphoric acid solution which selectively chemically etchs the aluminum with respect to silicon, passing current in a forward bias through the article to cause the exposed aluminum to be removed electrolytically, sensing the current flow, and terminating the application of current in said forward bias to the article at a time when a drop-off of at least about one third in the current flow occurs due to discontinuities appearing in the aluminum which is to be removed, and chemically removing the remaining aluminum.

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**3,865,705**

## PROCESS FOR MODIFYING THE SURFACE CHARACTERISTICS OF CARBON SUBSTRATES AND COMPOSITE ARTICLES PRODUCED FROM THE TREATED SUBSTRATES

**Jean-Philippe Rieux, Decines, and Jean Lehureau, Lyon, both of France, assignors to Rhone-Progil, Paris, France**

**Filed Apr. 12, 1973, Ser. No. 350,521**

**Claims priority, application France, Apr. 21, 1972, 72.14950**

**Int. Cl. C01d** *7/34*

**U.S. Cl. 204—130** **10 Claims**

1. A process for producing a reinforced composite article comprising at least one carbon reinforcing element contiguous

to and firmly bonded to a matrix of resin binder material, which process comprises:

a. pre-treating the surface of said carbon reinforcing element to improve its bonding properties in said carbon-resin binder matrix, which pre-treatment comprises (1) subjecting the surface of said carbon reinforcing element, as the anode, to electrolysis in an aqueous electrolyte whereby said surface is oxidized to form powdered carbon thereon without substantial degradation thereof and (2) thereafter subjecting the oxidized surface, as a cathode, to electrolysis in an aqueous electrolyte whereby the powdered carbon formed on said surface by the oxidation in (1) is removed;

b. contacting said pre-treated reinforcing element with said resin binder material; and

c. forming said composite into the desired shape.

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**3,865,706**

**CONCENTRATION AND COATING PROCESSES**

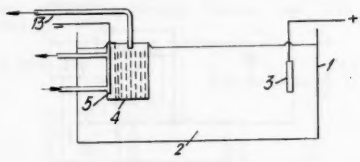
**Brian Alfred Cooke, Knotty Green, England, assignor to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 163,378, July 16, 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,289**

**Claims priority, application Great Britain, July 22, 1970, 35516/70**

**Int. Cl. B01k** *5/02*

**U.S. Cl. 204—181** **8 Claims**




1. A process of concentrating an electrolytic coating bath which contains a main liquid coating composition comprising ionized coating material, counterion and an aqueous medium and concurrently coating a conductive article by electrodeposition, wherein an electric current is passed through the composition between the article and a counter electrode in order to deposit coating material on the article and at least a portion of the main composition is introduced into a chamber defined at least in part by two opposed barriers of material substantially impermeable to ionized coating material but permeable to counterion, said chamber being so situated in the bath that the electrodes are external to said chamber but the electric current passes through the barriers and across the chamber, the components of the introduced composition which accumulate in the region of the barrier surfaces being separated and removed from the chamber and a composition enriched in ionized coating material being returned to the main composition.

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**3,865,707**

**COMBUSTIBLE MIXTURE ANALYZER**

**Donald A. Sayles, 1337 Beechwood Blvd., Pittsburgh, Pa.**

**Filed Dec. 27, 1972, Ser. No. 318,889**

**Int. Cl. G01n** *27/46*

**U.S. Cl. 204—195 S** **5 Claims**

1. A combustion mixture analyzer comprising,

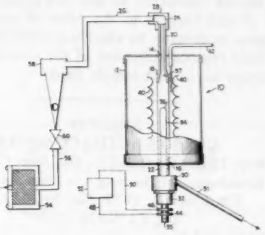
an electrochemical cell having a closed end tube of solid electrolyte mounted in a tubular housing, a pair of electrodes secured to said electrochemical cell, one electrode secured to the inner surface and one electrode secured to the outer surface of said closed end tube,

said tubular housing having a chamber therein for analyzing separately the quantities of a fuel and oxygen admixed to form a combustible mixture, said electrochemical cell positioned axially in said chamber,

said electrochemical cell arranged within said chamber to extend from one chamber end portion to an intermediate position within said chamber,

said chamber having a reduced diameter end portion spaced from said electrochemical cell and extending through the said tubular housing,

conduit means having an inlet and outlet opening for supplying a continuous flow of the combustible mixture to said chamber,



flame arresting means located at the inlet to said conduit means for preventing explosions of the combustible mixture supplied to said conduit means,

metering means in said conduit means for measuring the volumetric rate of flow of the combustible mixture passing through said conduit means,

heating means for heating said electrochemical cell to a preselected temperature, and

means for controlling said heating means.

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**3,865,708**

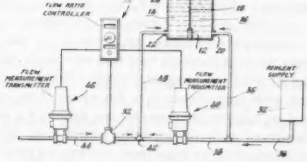
**APPARATUS FOR MEASURING IONIC CONCENTRATION**

**Truman S. Light, Lexington, and Kenneth S. Fletcher, III, Norfolk, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

**Continuation of Ser. No. 887,092, Dec. 22, 1969, abandoned. This application Jan. 26, 1973, Ser. No. 327,215**

**Int. Cl. G01n** *27/46*

**U.S. Cl. 204—195 M** **7 Claims**




1. Apparatus for making on-stream measurements of the ionic concentration of a sample fluid by analyzing cell structure including an ion-selective membrane system which is non-responsive to the particular ion to be measured in said fluid sample, said cell structure being formed to provide two fluid regions each coupled to a corresponding element of said membrane system, and means connected to said fluid regions to sense electrical potential therebetween;

said apparatus comprising:

first means for furnishing a flow of said sample fluid;

second means for providing a supply of reagent containing an ion to which said membrane system is sensitive and

which when mixed with said sample fluid reacts therewith to reduce the concentration of said reagent ion in correspondence to the concentration of said particular ion;

mixing means coupled to said first and second means to receive said flow of sample fluid and a corresponding flow of said reagent and to develop a mixture thereof in a specific controllable proportion;

third means connecting said mixing means to said cell structure to supply said mixture to one of said fluid regions; and

fourth means connected to said cell structure to supply a flow of said reagent to the other of said fluid regions, whereby to develop an electrical potential between said two fluid regions indicative of the concentration of said particular ion in said sample fluid.

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**3,865,709**

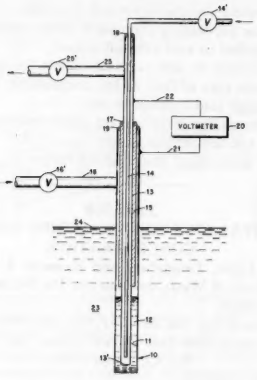
## CARBON ACTIVITY METER

**Prodyot Roy, 12980 Foothill Ln., San Jose, Calif. 95070, and Jan L. Krankota, 201 Herlong Ave., San Jose, Calif. 95123**

**Filed Nov. 2, 1973, Ser. No. 412,396**

**Int. Cl. G01n** *27/46*

**U.S. Cl. 204—195 R** **2 Claims**




1. A meter for measuring carbon activity in liquid sodium comprising: means defining a first electrode and containing a molten electrolyte therein selected from the group consisting of (1) a mixture of $Na_2CO_3$, $K_2CO_3$ and $Li_2CO_3$ and (2) $CaCl_2$ + $CaC_2$, said first electrode means comprising a cup shaped member constructed of nickel and containing said electrolyte in the lower portion thereof, said first electrode means having a thin film of gold covering at least the inner surface thereof in contact with said electrolyte for preventing corrosion of said nickel by said electrolyte, means defining a second electrode positioned at least partially within said first electrode means and including a closed end portion surrounded by said electrolyte, said second electrode means comprising a tubular shaped member constructed of nickel and positioned within said cup shaped member in spaced relation therewith, said second electrode means having a thin film of gold covering at least the outer surface thereof in contact with said electrolyte for preventing corrosion of said nickel by said electrolyte, electrical insulator means composed of material selected from the group consisting of quartz and magnesia positioned intermediate said first and second electrode means, means connected to said first electrode means for controllably supplying a cover gas above said electrolyte, seal means positioned to prevent cover gas leakage between said first and second electrode means, means for controllably supplying a reference gas interior of and adjacent to said closed end portion of said second electrode means including a capillary tube means extending into said second electrode means and terminating at one end thereof in spaced relation with respect to said closed end portion of said second electrode means, said capillary tube means having the other end thereof connected to a valved conduit means for controllably supplying reference gas thereto, seal means positioned to prevent leakage of said reference gas from said second electrode means, means connected to said second electrode means in spaced relation with respect to said closed end portion thereof for controllably discharging said reference gas therefrom, and means electrically connected to said first and second electrode means for measuring the electrochemical potential therebetween.

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**3,865,710**

## PURIFICATION CONTROL UNIT

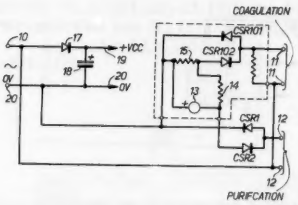
**Richard John Phipps, Newbury, England, assignor to Camper & Nicholsons (Holdings) Limited, Gosport, England**

**Filed Feb. 26, 1973, Ser. No. 335,952**

**Claims priority, application Great Britain, Mar. 7, 1972, 10464/72; July 19, 1972, 33666/72**

**Int. Cl. B01k** *3/00;* **H02j** *3/14*

**U.S. Cl. 204—228** **9 Claims**




1. A water purification control circuit having a pair of supply terminals, first and second pairs of unidirectional output terminals, a network including controlled rectifiers and interconnecting said supply and output terminals for supplying to said first and second pairs of output terminals purification and coagulation currents respectively, a multivibrator circuit connected with said network, and circuit means controlling the operation of the multivibrator circuit, the arrangement being such that a change in state of the multivibrator circuit changes the conducting state of the controlled rectifiers to reverse the polarity of both pairs of the output terminals.

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**3,865,711**

## APPARATUS FOR REMOVAL OF DISSOLVED OR SUSPENDED SOLIDS IN WASTE WATER

**Harry T. Anderson, Clarendon Hills, Ill., assignor to Swift & Company, Chicago, Ill.**

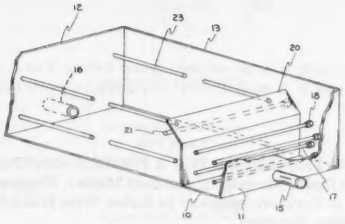
**Division of Ser. No. 191,008, Oct. 20, 1971, Pat. No. 3,816,274. This application Nov. 23, 1973, Ser. No. 418,429**

**Int. Cl. B03c** *5/02;* **B01k** *3/00*

**U.S. Cl. 204—275** **5 Claims**

1. An apparatus for treating water-oil emulsion systems comprising a container having an entry conduit and an exit conduit and having a baffle across the width of the container and positioned nearer the inlet end than the discharge end thereby dividing said container into an inlet zone and a discharge zone, the lower section of said baffle being substantially parallel to the inlet end of the container and the upper section of said baffle being inclined toward the discharge end of said container, cylindrical anodes in the inlet zone spaced

transverse to the longitudinal axis of the container, and cylindrical anodes in the discharge zone spaced parallel to the




longitudinal axis of the container at about nearly equal distance apart in the discharge zone.

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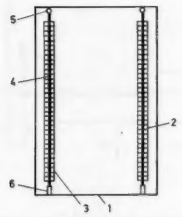
**3,865,712**

## ELECTRODE ARRANGEMENT FOR AN ELECTROPHORETICAL SEPARATION PERFORMED IN A GEL PLATE

**Hilary E. W. Davies, Stockholm, Sweden, assignor to LKB-Produkter AB, Bromma, Sweden**

**Filed Apr. 11, 1974, Ser. No. 460,038**
**Claims priority, application Sweden, Apr. 13, 1972, 73053332/72**
**Int. Cl. B01k** *5/00*
**U.S. Cl. 204—299** **4 Claims**




**1.** Electrode arrangement for an electrophoretical separation performed in a gel plate, characterized in that it comprises a mainly rectangular plate, parallel to said gel plate, which plate on its side facing the gel plate exhibits two parallel rows of toothed elevations and two electrodes, extending one along each row, said electrodes, consisting of threads of an inert, conducting material, and wherein each electrode is pressed against the gel or against a strip, consisting of a porous material and impregnated by buffer solution and which is lying on the gel, by the toothed elevations.

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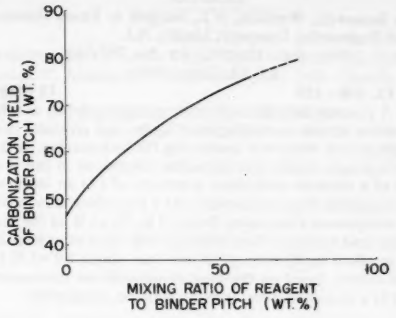
**3,865,713**

## CARBONACEOUS REAGENT FOR CARBONACEOUS BINDER USED IN THE MANUFACTURE OF FIRED CARBON ARTICLES AND CARBON-BONDED REFRACTORIES

**Yoshio Kawai; Kiro Asano, and Kiyoshi Yamaki, all of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed June 7, 1973, Ser. No. 367,449**
**Claims priority, application Japan, June 12, 1972, 47-57655**
**Int. Cl. C10c** *3/04*
**U.S. Cl. 208—6** **11 Claims**

**1.** A method for preparing a carbonaceous reagent for a carbonaceous binder used in the manufacture of fired carbon articles and carbon-bonded refractories in order to increase the carbonization yield of said binder, which comprises oxidizing a carbonaceous raw material at a temperature of from




15°C. to 400°C. with an oxidizing agent to provide an atomic ratio of oxygen to carbon therein of from 0.05 to 0.30.

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**3,865,714**

## METHOD FOR REDUCING THE SULFUR CONTENT OF A PETROLEUM FRACTION

**Paul F. Warner, Phillips, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed June 7, 1971, Ser. No. 150,815**
**Int. Cl. C10g** *29/20*
**U.S. Cl. 208—238** **6 Claims**

**1.** A method for reducing the sulfur content of a volume of petroleum fraction having a distillation end point below about 600°F and containing mercaptans, comprising:

contacting the liquid petroleum fraction with one of a polymer of a conjugated diene, a copolymer of a conjugated diene, a copolymer of a conjugated diene with vinyl aromatic compounds for forming a resultant mixture, said polymer having at least about 30 double bonds per molecule;

subjecting said resultant mixture to one of an organic peroxide, hydrogen peroxide, hydroperoxide or azonitrile; and separating the petroleum fraction from the polymer.

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**3,865,715**

## METHOD FOR THE REFINING OF GASOLINES TO HIGH-OCTANE FUEL

**Nikolai Sergeevich Nametkin, Leninsky prospekt 13, kv. 11; Sergei Pavlovich Gubin, B.Pochtovaya ulitsa, 40, kv. 5; Vladimir Dmitrievich Tjurin, Leninsky prospekt, 67, kv. 33; Viktor Viktorovich Fedorov, 3 Samotechny pereulok, 24, kv. 88; Valery Zeilikovich Usachev, ulitsa Zarechnaya, 11, korpus 1, kv. 4, all of Moscow; Mikhail Semenovich Matveev, ulitsa Shkolnaya 3, kv. 12, Gorkovskaya oblast; Leonid Ivanovich Larionov, ulitsa Minina 15-A, kv. 8, Gorky; Alexandr Solomonovich Eliner, ulitsa Shvernika, 9, korpus 4, kv. 34, and Ruslan Yakolevich Barashkov, Bebozhny pereulok, 19, korpus 17, kv. 4, both of Moscow, all of U.S.S.R.**

**Filed Dec. 29, 1972, Ser. No. 319,383**
**Claims priority, application U.S.S.R., Dec. 30, 1971, 1728801**
**Int. Cl. C10g** *29/00*
**U.S. Cl. 208—243** **4 Claims**

**1.** A method of refining gasoline to obtain high-octane fuels comprising mixing the gasoline stock with complex compounds of lower-valency transition metals selected from the group consisting of iron, nickel, molybdenum and manganese, said complex compounds selected from the group consisting of the carbonyls of said metals, the complex compounds of the salts of said metals with triphenylphosphine ligands, and the complex compounds of the salts of said metals with lithium aluminum hydride, followed by heating the resulting mixture in the 80° to 100°C temperature range and distilling off the target product.

## 3,865,716
## PROCESS FOR THE SELECTIVE HYDROGENATION OF OLEFINS

**John Sosnowski, Westfield, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Sept. 13, 1973, Ser. No. 397,001**
**Int. Cl. C10g** *23/06*
**U.S. Cl. 208—255** **10 Claims**

1. A process for selectively hydrogenating olefins in a hydrocarbon stream containing both olefins and aromatic compounds, which comprises contacting the hydrocarbon stream with hydrogen under hydrogenation conditions in the presence of a catalyst comprising a mixture of (1) an inorganic non-crystalline base component, (2) a crystalline aluminosilicate component comprising from 10 to 70 wt.% of the total catalyst and having a silica/alumina mole ratio of at least 2.5 and an alkali metal content of less than about 2.0 wt.% (as alkali oxide), based on the total aluminosilicate component, and (3) a transitional metal hydrogenation component.

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## 3,865,717
## SIZE SEPARATION OF POLYDISPERSE SUSPENSIONS BY HYDRODYNAMIC CHROMATOGRAPHY

**Hamish Small, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 859,331, Sept. 19, 1969, abandoned. This application Dec. 8, 1972, Ser. No. 313,506**
**Int. Cl. B03b** *3/00*
**U.S. Cl. 209—1** **6 Claims**

1. A process for the separation of first particles of a polydisperse suspension of first particles in a liquid dispersing medium by size, by passing the suspension through a porous body formed of a plurality of second particles, said second particles being impermeable with respect to said first particles, the body having generally uniform porosity, the porous body having a liquid flow path of sufficient size to permit passage of the first particles therethrough, the method comprising

adding a suspension of first particles in a liquid dispersing medium to the porous body, the porous body being generally inert to the dispersing medium, the particles being generally non-adherent to the porous body when in the dispersing medium,

eluting the porous body with the dispersing medium to cause the first particles to pass through voids between the second particles forming the porous body, and subsequently

collecting an effluent stream of dispersing medium and first particles from the porous body wherein larger first particles of the dispersion are initially removed from the porous body and successively smaller first particles are subsequently removed therefrom, with the further limitation that the apparent velocity of the first particles through the porous body is equal to or greater than the apparent velocity of the fluid suspending medium through the porous body.

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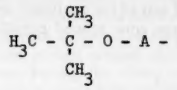
## 3,865,718
## FROTHERS FOR THE FLOTATION OF SULFIDIC ORES

**Elmer C. Tveter, deceased, late of Walnut Creek, Calif. (by Cora Belvin Judd Tveter, executrix); Guy H. Harris, Concord, Calif., and Lowell B. Lindy, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 7, 1972, Ser. No. 313,155**
**Int. Cl. B03d** *1/02*
**U.S. Cl. 209—166** **6 Claims**

1. The method which comprises subjecting an aqueous pulp of a sulfidic ore of one or more of the metals lead, zinc, copper, molybdenum, nickel, cobalt, antimony, silver, mercury, gold, cadmium and arsenic to froth flotation in the presence of a collector and one or more organic frothing agents corresponding to the formula



wherein each A is an alkylene group having 2 or 3 carbon atoms, and R is methyl, ethyl, n-propyl, i-propyl, i-butyl or t-butyl.

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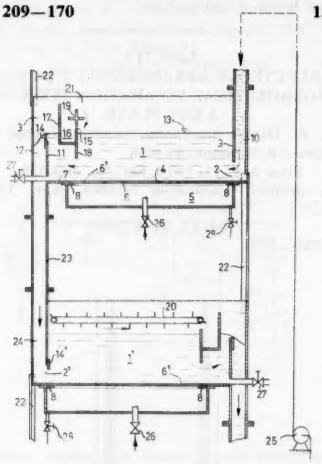
## 3,865,719
## FLOTATION DEVICE FOR A FIBROUS SUSPENSION

**Herbert Holik, Ravensburg, and Karl Mueller, Ringgenweiler, both of Germany, assignors to Escher Wyss G.m.b.H., Ravensburg, Germany**

**Filed Dec. 4, 1972, Ser. No. 311,484**
**Claims priority, application Germany, Dec. 9, 1971, 2161015**
**U.S. Cl. 209—170** **13 Claims**



1. A flotation device for purifying a suspension of fibrous material and especially for deinking a paper stock suspension, the device comprising a container for said suspension; suspension inlet and outlet apertures at opposite sides of the container and connected, respectively, with inlet and outlet ducts; means for the gas treatment of said suspension inlcuding a gas distributor arranged in the lower portion of the container and having a stationary wall which is provided with gas throughflow apertures and forms a boundary wall for said suspension, the gas throughflow apertures, in plan view, being arranged at least over a portion of the base area of the container and being so sized and distributed that the intensity of the gas treatment effected decreases in the direction from the inlet to the outlet side of the container; and means for discharging from the surface of the suspension foam produced by the gas treatment.

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## 3,865,720
## RELEASABLE CONNECTION FOR INTERSECTING MEMBERS

**Albert Wilson, Columbia, S.C., assignor to Litton Systems, Inc., Passaic, N.J.**

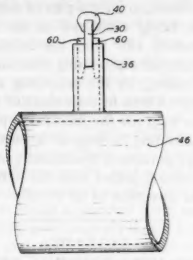
**Filed June 15, 1972, Ser. No. 263,299**
**Int. Cl. B07b** *1/46*
**U.S. Cl. 209—405** **9 Claims**

1. Bulk material processing equipment: comprising

a. deck means for receiving bulk material;

b. a plurality of support members forming a support means for said deck means and extending in a predetermined direction;

c. a plurality of cross-members each extending beneath and across said support members;




d. a plurality of vertical posts carried by each of said cross-members, in spaced relationship thereon, for coaction with and to support said support members; and

e. wedge means releasably connecting said cross-members and said support members together.

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**3,865,721**

**METHOD FOR INTRODUCTION AND CIRCULATION OF OXYGEN OR OXYGENOUS GAS IN A LIQUID WHICH IS TO BE CLARIFIED, AND APPARATUS FOR CARRYING OUT THE METHOD**

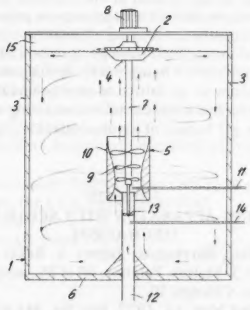
**Joseph Richard Kaelin, Villa Seeburg, CH-6374 Buochs, Switzerland**

**Filed Sept. 1, 1972, Ser. No. 285,918**

**Claims priority, application Switzerland, Sept. 2, 1971, 12925/71**

**Int. Cl. C02c** *1/10;* **B01f** *3/04*

**U.S. Cl. 210—7** **18 Claims**




**1.** A method of introducing and circulating a mixture of gases containing oxygen in a liquid present in an activating basin of a clarifying plant, comprising the steps of:

utilizing a surface aerator formed as a rotor for generating a circulatory, radially outwardly flow of the liquid within the surface region of said liquid toward the sidewalls of said basin, and a downward flow of said liquid along said sidewalls of said basin which commences within said surface region of said liquid and continues downwardly; and

utilizing a liquid impeller device disposed non-contiguously below said surface aerator for generating an additional and complementary flow and circulation upwardly within, and along and from the bottom portion of, said basin toward the suction aperture of said surface aerator, whereby a high velocity cyclical flow of said liquid outwardly along said surface of said liquid, downwardly along said sidewalls of said basin, radially inwardly along the bottom portion of said basin, and upwardly toward said surface of said liquid, as well as a spiral motion intermediate said surface and bottom regions and within the vicinity of said sidewalls along the vertical extent thereof, is generated.

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**3,865,722**

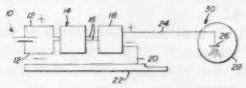
**CORONA DISCHARGE TREATMENT OF AN OIL SLICK**

**Patrick C. Stoddard, 7734 Leonard Dr., Falls Church, Va. 22043**

**Filed Oct. 25, 1972, Ser. No. 300,520**

**Int. Cl. C02b** *9/02*

**U.S. Cl. 210—42** **7 Claims**




**1.** A process for removing a non-emulsified, immiscible liquid hydrocarbon floating on the surface of a body of water in a thin, substantially continuous layer comprising positioning a corona generating electrical lead above said liquid hydrocarbon, applying sufficient electrical energy to said lead to generate a corona and subject said liquid hydrocarbon to the action of said corona, continuing the application of said electrical energy until said liquid hydrocarbon becomes electrically charged and increases in surface tension, and then removing said liquid hydrocarbon from said surface.

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**3,865,723**

**METHOD TO FORM STABLE COMPLEXES OF POLYANIONS OCCURRING IN BIOLOGICAL LIQUIDS**

**Maria Antonietta Marchisio; Paolo Ferruti; Tito Longo, and Ferdinando Danusso, all of Milan, Italy, assignors to Zambon, Bresso and Milan, Italy**

**Filed Mar. 21, 1973, Ser. No. 343,358**

**Claims priority, application Italy, Mar. 21, 1972, 22152/72**

**Int. Cl. A61k** *17/18*

**U.S. Cl. 210—54** **10 Claims**

**1.** A method of treating blood to firmly complex, neturalize and thereby eliminate heparin occurring therein, comprising adjusting the blood to a pH between 3 and 10, contacting said pH adjusted blood for a tme ranging from about 1 to 600 seconds with a polymer comprising monomeric units derived from:

A. the group consisting of bis-acryl-piperazines and aliphatic bis acryl amides of the formula

$$CH_2=CH-CO-\underset{\underset{R_1}{|}}{N}-(CH_2)_n-\underset{\underset{R_2}{|}}{N}-CO-CH=CH_2$$

wherein

$n = 1$ to 6 and $R_1$, $R_2$ being the same or different, are either H or alkyl of 1 to 6 carbon atoms; and at least

B. the group consisting of primary or secondary di-amines of the formula

$$\underset{\underset{R_1}{|}}{NH}-(CH_2)_n-\underset{\underset{R_2}{|}}{N}-R_3,$$

wherein

$n = 1$ to 6 and $R_1$, $R_2$ and $R_3$ are selected from the group consisting of H and alkyl with 1–6 carbon atoms, provided that only one of them is hydrogen and when $R_1 = CH_3$, $R_2$ is different from $CH_3$;

with possible further monomeric units derived from:

C. the group consisting of piperazine mono- and dicarboxylic acids and aliphatic amino-acids of the formula $H_2N\text{-}CH_2\text{—}(R)_n\text{—}COOH$.

where *n* may be 0 or 1 and R is a linear or branched aliphatic radical containing 1 to 6 carbon atoms;

D. the group consisting of allyl-amine and aliphatic, saturated amino compounds containing from 2 to 12 carbon atoms and two primary amine groups; or

E. the group consisting of vinyl-pyrrolidone, N-acrylylmorpholine and acryl-amide.

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**3,865,724**

**SLIME CONTROL COMPOSITIONS AND THEIR USE**

**Bernard F. Shema, Glenside; Robert H. Brink, Jr., Doylestown, and Paul Swered, Philadelphia, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed June 15, 1973, Ser. No. 370,485**

**U.S. Cl. 210—62** **8 Claims**

3. A method for controlling the growth of the microorganism *Aerobacter aerogenes* in an aqueous system which comprises adding to said system an effective amount for the purpose of a composition comprised of 2-2-dibromo-3-nitrilopropionamide and Bis-1,4-bromoacetoxy-2-butene, wherein the weight ratio of the amide to the butene ranges from about 5:95 to about 95:5 respectively.

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**3,865,725**

**METHOD FOR SEPARATING PARTICLES FROM A LIQUID**

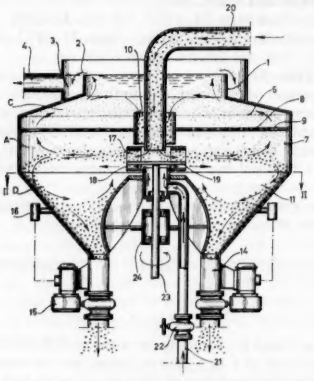
**Elie Condolios, Grenoble, France, and Uilke Van Essen, Gorinchem, Netherlands, assignors to N.V. Technische Maatschappij Bergmann, Berkel en Roodenrijs, Netherlands and Societe Grenobloise D'Etudes et D'Applications Hydrauliques, Grenoble-Gare, France**

**Continuation of Ser. No. 217,106, Jan. 12, 1972. This application May 3, 1974, Ser. No. 466,800**

**Claims priority, application France, Jan. 14, 1971, 71.01869**

**Int. Cl. B01d** *21/26*

**U.S. Cl. 210—73** **3 Claims**



1. A method for separating particles from a mixture of liquid and particles wherein the particles comprise a lighter fraction and a heavier fraction, by introducing the mixture of liquid and particles centrally into a cylindrical horizontally disposed basin and producing a free substantially unobstructed horizontal flow from the center of the basin, said flow mixture of liquid and particles being caused to flow out from the center of the basin in a radial direction while imparting a relatively minor component of velocity in tangential direction to the radially outward flowing mixture to subject the flowing mixture to centrifugal force such that a whirling horizontal field of the mixture is created, the tangential component being relatively minor with respect to the radial velocity component, the mixture after traversing the horizontal whirling field being forced along a conical surface towards the center of the basin to permit heavier particles to move in a downward direction in the basin, the heavier fraction particles being discharged in the bottom of the basin, at least a part of said radially horizontal outward flow being deflected in an upward direction through approximately 180° from the central introduction of the mixture and around a screening area, and wherein a portion of the flow passing by the screening area is radially inwardly returned to an area in the center of the basin which is situated above the inlet for the mixture, a part of the radially inward flow constituting a ring of a vertically descending mixture, the lighter portion of this radially inward flow following an upward course together with the lighter fraction particles moving in the direction of an overflow edge.

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**3,865,726**

**BLOOD UREA REMOVAL DEVICE**

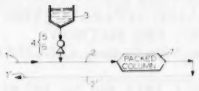
**Ichiro Chibata, Suita; Tetsuya Tosa, Kyoto; Tadashi Sato, Takatsuki, and Takao Mori, Suita, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka-shi, Osaka-fu, Japan**

**Filed Oct. 5, 1973, Ser. No. 403,980**

**Claims priority, application Japan, Oct. 6, 1972, 47-101005**

**Int. Cl. B01d** *31/00*

**U.S. Cl. 210—152** **4 Claims**



1. A blood urea removal device which consists essentially of a fluid passage having an inlet at one end and an outlet at the other end, a column packed with an enzyme preparation in the passage, and a means for feeding a fumarate-containing solution connected to said fluid passage upstream of said column, the enzyme preparation being microcapsules containing urease in a membrane or gel lattice of semi-premeable high polymeric substance and microcapsules containing aspartase in a membrane or gel lattice of semi-permeable high polymeric substance.

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**3,865,727**

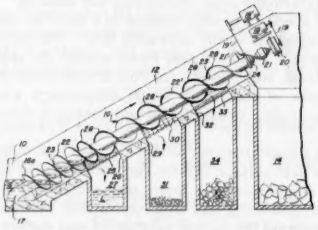
**PUMPING APPARATUS WITH SEPARATING MECHANISM**

**Fred W. Broling, Barrington; Jeffrey A. Baker, Northbrook, and Edward J. Matras, Palatine, all of Ill., assignors to FMC Corporation, Chicago, Ill.**

**Filed Mar. 14, 1973, Ser. No. 341,032**

**Int. Cl. B01d** *23/20*

**U.S. Cl. 210—162** **2 Claims**



1. Apparatus for progressively separating the solid components and liquid component from debris laden flow comprising: a sump to receive said flow, an inclined trough to direct said flow during separation, said trough communicating with

said sump at one end and having a discharge outlet at the opposite end, said trough having a plurality of axially spaced ports, screen means located in said ports to permit said components to be separated from said flow, said screen means being of progressively larger porosity at increased spacings from said sump, screw pump means for conveying said flow through said trough from the sump to the opposite end whereby said flow is conveyed over said screen means, said screw pump means having a first flight portion between said sump and a first adjacent port, and a second flight portion adjacent said discharge outlet, said second flight portion having a pitch that is greater than said first flight portion, said liquid component being separated from said flow by the first screen means while progressively larger solid components are separated from said flow at subsequent screens means, and any solid components not separated by said screen means are discharged through said discharge outlet, said screw pump including a pair of axially aligned tubes with the respective flight portions on the respective tubes and in which said tubes are rotated at different speeds.

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### 3,865,728
### ALGICIDAL SURFACE

**Eugene A. Abbott, Freeland; Alan J. Isquith, Midland, and Patrick A. Walters, Freeland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Continuation-in-part of Ser. No. 198,452, Nov. 12, 1971, abandoned, Division of Ser. No. 226,288, Feb. 14, 1972, Pat. No. 3,817,739. This application Feb. 25, 1974, Ser. No. 445,512**

**Int. Cl. E04h** *3/20;* **B01d** *39/00*

**U.S. Cl. 210—169** **4 Claims**

1. A filter for an aquarium consisting essentially of a fibrous material having bonded thereto a coating consisting essentially of an algicidal amount of an organosilicon compound of the unit formula $Y^-R''N^+(Me_{3-a})[R'SiR_nO_{3-n/2}]_a$ in which

Y is chlorine or bromine,

R'' is the methyl radical or an aliphatic hydrocarbon radical of 11 to 22 carbon atoms,

R' is a divalent hydrocarbon radical of one to 10 carbon atoms,

R is a monovalent hydrocarbon radical of one to 6 carbon atoms or the $CF_3CH_2CH_2$— radical,

*n* is an integer from 0 to 2, and

*a* is an integer from 1 to 2.

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### 3,865,729
### PUMP FOR LIQUIDS, ESPECIALLY CIRCULATING PUMP FOR AQUARIUMS

**Ulrich Baensch, Herrenteich, 452 Melle, Germany**

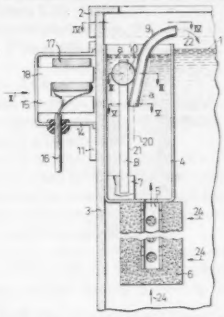
**Filed July 25, 1973, Ser. No. 382,477**

**Claims priority, application Germany, July 26, 1972, 2236521**

**Int. Cl. E04h** *3/20;* **F04b** *17/04*

**U.S. Cl. 210—169** **17 Claims**

1. In a pump, especially for liquids, a container having a bottom wall and side walls and open at the top, a pipe disposed in a generally vertical plane and having an inlet end at the bottom extending into the container from above and a laterally offset outlet end at the top which is directed outwardly over the upper edge of the container, said container being adapted to receive liquid in an amount sufficient to immerse at least the lower end of said pipe, a spring in the container connected to the pipe and resiliently supporting the pipe for oscillatory movement in a substantially horizontal direction in the container, magnetic armature means connected to the pipe, and an electromagnet in about the same horizontal plane as said armature and engageable by a pulsating electric current to cause said armature and pipe to oscillate and thereby



pump liquid from within the container out over the upper edge of the container.

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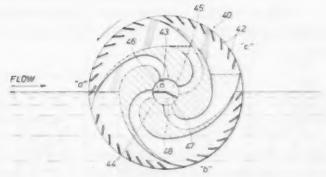
### 3,865,730
### OIL SPILL CLEANUP

**Ray R. Ayers, and Dean P. Hemphill, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Division of Ser. No. 289,043, Sept. 14, 1972,. This application Dec. 17, 1973, Ser. No. 425,579**

**Int. Cl. E02b** *15/04*

**U.S. Cl. 210—242** **3 Claims**




1. An apparatus for removing oil from the surface of water comprising a rotatable drum immersed in the water up to about its axis of rotation, compartments arranged around the periphery of the drum for admitting oil and water to an axial chamber in the drum, said compartments comprising spiraling funnels diminishing in cross-sectional area from the periphery of the drum to the axial chamber, said axial chamber being divided into upper and lower rooms, the lower room providing an exit for a water-rich effluent, and the upper room providing an exit for an oil-rich effluent.

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### 3,865,731
### FILTER SKIMMING DEVICE

**Lamont J. Seitz, Huntington Beach, Calif., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.**

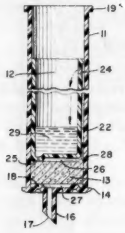
**Filed Dec. 21, 1973, Ser. No. 427,198**

**Int. Cl. B01d** *33/00*

**U.S. Cl. 210—359** **3 Claims**

1. A filter skimming device comprising an elongated plunger assembly, said assembly comprising an elongated outer plunger tube, an elongated tubular insert and a cylindrical filter element disposed therebetween, said plunger tube having a peripheral rim adapted for slidable sealing engagement of the inner walls of a test tube, a downwardly extending small bore probe and a projection on its inner bottom upon which said filter element is seated, said tubular insert being shorter in length than said plunger tube, being adapted to be inserted in snug relationship therewith and having a channel in its outer wall extending substantially throughout its entire

length whereby a tubelike capillary space is formed between the outer wall of said tubular insert and the inner wall of said plunger tube, said tubular insert further having a projection on




its outer bottom adapted for seating on said filter element, said channel terminating at a wall near the top and communicating with the interior of said tubular insert by a small bore opening transverse to said channel.

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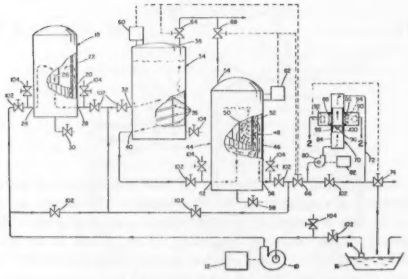
**3,865,732**

**EMULSION BREAKER**

**Ralph D. Terhune, and James C. Duke, both of Tulsa, Okla., assignors to Fram Corporation, East Providence, R.I.**

**Filed Nov. 27, 1972, Ser. No. 309,794**
**Int. Cl. B01d** *25/06*
**U.S. Cl. 210—315** **1 Claim**



1. An emulsion breaker for removing trace amounts of hydrocarbon from water, comprising

a housing having an inlet and an outlet,

a first, radially inner annular element in said housing, having an inlet side communicating with said inlet, and an outlet side,

a second, radially outer annular element in said housing, having an inlet side communicating with said outlet side of said first element, and an outlet side directly communicating with said outlet of said housing,

each of said elements having water resistant, preferentially hydrocarbon wettable polyester fibers,

said first element having natural fibers resin impregnated for water resistance and mixed with said polyester fibers in a ratio such as to provide a tight, sheetlike pleated medium of lower micron rating than that of said second element said micron rating of said first element being between 1 and 25, for coalescing hydrocarbon in said water into droplets,

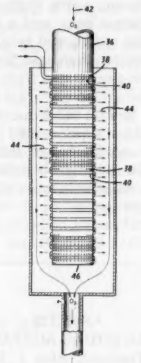
said second element having the form of a fibrous batt for removing from said hydrocarbon droplets any water bubbles surrounding them.

**3,865,733**

**APPARATUS FOR THE PRODUCTION OF OZONE**

**Leland Thomas Taylor, 701 Madison St., N.E., Albuquerque, N. Mex. 87110**

**Filed Jan. 30, 1974, Ser. No. 437,729**
**Int. Cl. C01b** *13/12*
**U.S. Cl. 250—532** **10 Claims**




1. Apparatus for the conversion of oxygen to ozone comprising:

a. at least two mutually interwoven abutting wire electrodes;

b. each of said at least two electrodes comprising an electrically conductive core and an insulating cover, said insulating cover being substantially inert to ozone;

c. means for charging each of said two electrodes to establish a corona discharge area between said electrodes;

d. the insulating cover being of sufficient thickness to protect the core from attack by ozone but being thin enough to permit establishment of a field of sufficient strength to ionize oxygen at the rate of charge supplied; and

e. means for directing oxygen at the corona discharge area between said electrodes;

f. whereby ozone is formed in the corona discharge area of the two electrodes.

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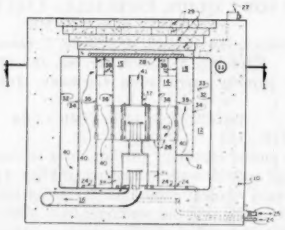
**3,865,734**

**IRRADIATOR APPARATUS**

**David D. Woodbridge, Eau Gallie, Fla., assignor to McMillin Investments, Inc., Vero Beach, Fla.**

**Filed Oct. 24, 1972, Ser. No. 300,202**
**Int. Cl. G01n** *21/26*
**U.S. Cl. 250—432** **6 Claims**



1. Apparatus for treating polluted fluids comprising in combination:

a. a casing including a plurality of inputs and outputs therefrom;

b. core means located in said casing defined a flowpath for liquid therethrough from at least one input to at least one output;

c. said core means having a central overflow pipe and a plurality of chambers each chamber being operatively connected to at least one other chamber for the feeding of liquid from one to the other and out the overflow pipe;
d. radiation sources located in said core means for irradiating liquids passing therethrough;
e. gas feed means operatively connected to said core means for feeding a gas into said core means through liquid passing through said core means;
f. bleed means located to allow accumulated gases in said core means to escape therefrom; and
g. baffle means located in spaced relationship to at least one gas feed means through said liquid in said core means, whereby liquid passing through said apparatus is irradiated during chemical treatment.

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**3,865,735**

## OVERBASED BRANCHED CHAIN ALIPHATIC SULFONATE WATERFLOOD ADDITIVES

**Charles R. Clark; M. Duane Gregory, both of Ponca City, Okla.; Delmar D. Krehbiel, Lubbock, Tex.; Claud D. Butler, and Carl D. Kennedy, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Filed Jan. 19, 1973, Ser. No. 324,909**
**Int. Cl. C09k** *3/00*
**U.S. Cl. 252—8.55 D** **4 Claims**

1. An anionic waterflood additive comprising a sulfonate derived from a non-linear alkene having about 7 to about 18 carbon atoms plus an overbasing amount of base component; wherein the ratio: weight of excess base component/weight of sulfonate is about 0.03 to about 2.0; the base component being an alkali metal hydroxide, ammonium hydroxide, or an alkali metal carbonate.

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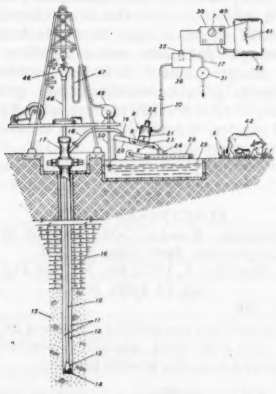
**3,865,736**

## RADIOACTIVE GREASE CONTAINING KRYPTON 85

**Bernard A. Fries, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 281,869, Aug. 18, 1972, which is a continuation-in-part of Ser. No. 55,635, July 17, 1970, abandoned. This application Aug. 9, 1973, Ser. No. 386,930**
**Int. Cl. C10m** *5/28, 7/52*
**U.S. Cl. 252—11** **5 Claims**



1. A lubricating grease containing at least one microcurie per cubic centimeter of said grease of gaseous krypton 85 dispersed therein.

**3,865,737**

## PROCESS FOR PREPARING HIGHLY-BASIC, MAGNESIUM-CONTAINING DISPERSION

**Paul Clifford Kemp, Wilmington, Del., assignor to Continental Oil Co., Ponca City, Okla.**

**Continuation-in-part of Ser. No. 245,635, April 19, 1972, abandoned. This application July 2, 1973, Ser. No. 374,210**
**Int. Cl. C10m** *1/40*
**U.S. Cl. 252—33.4** **19 Claims**

1. A process for preparing a fluid, highly-basic, magnesium-containing dispersion wherein the process comprises:
a. forming an admixture of:
i. about 75 to about 125 parts of oil soluble dispersing agent selected from the group consisting of oil soluble sulfonic acids, mixtures of oil soluble sulfonic acids and aliphatic hydrocarbon monocarboxylic acids and the metal salts thereof,
ii. about 20 to about 90 parts magnesium oxide,
iii. about 100 to about 500 parts volatile aliphatic hydrocarbon solvent having a boiling point below about 150°C,
iv. about 2 to about 30 parts of an alcohol selected from the group consisting of $C_1$ to $C_6$ aliphatic alcohols and alkoxy ethanols containing 3 to 7 carbon atoms,
v. about 30 to about 50 parts water, and
vi. ammonia or an ammonium compound in an amount sufficient to provide about 0.6 to about 9 parts ammonia,
b. treating the admixture of step (a) with at least one mole of carbon dioxide per mole of overbasing magnesium present,
c. adding to the carbonated admixture about 100 to about 300 parts of a nonvolatile diluent oil having a boiling point above 160°C, and
d. removing the volatile materials,
said process being characterized further in that:
a. the magnesium oxide has the following properties:

| | |
|---|---|
| Bulk Density, less than lbs/cu.ft. | 16 |
| Pore volume, cc/g., above | 0.75 |
| Iodine No., below | 100, and |

b. the amount of alcohol in step (a) (iv) is in the range of about 0.1 to about 4.0 moles per mole of dispersing agent.

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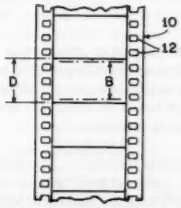
**3,865,738**

## METHOD OF MAKING MOTION PICTURES

**Miklos Lente, 79 Laurentide Dr., Toronto, Ontario, Canada**

**Filed Jan. 21, 1974, Ser. No. 434,868**
**Int. Cl. G03b** *19/18*
**U.S. Cl. 352—44** **6 Claims**




1. A method of making a wide screen picture on 35mm film having a plurality of edge perforations at longitudinally spaced intervals along the length of the film having a standard perforation pitch length comprising the steps of:
a. photographing a scene on an original film to provide photographic images having a frame length in the direction of the longitudinal extent of the film no greater than three perforation pitch lengths;

b. repeatedly thereafter advancing said original film a distance equal to three perforation pitch lengths and photographing a plurality of successive scenes to provide successive photographic images each having a frame length no greater than three perforation pitch lengths;
c. processing and finishing said original film to provide a finished original suitable for printing; and
d. subsequently preparing print films having edge perforations having the same standard pitch length by printing successive original film frame images onto said print film by successively advancing the original film in a series of lengths measuring three perforation pitch lengths and successively advancing the print film in a series of lengths measuring four pitch lengths.

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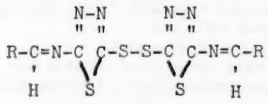
**3,865,739**
**THIADIAZOLE DERIVATIVE, MIXTURE AND COMPOSITIONS THEREOF**

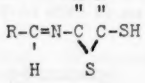
**James O. Waldbillig, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.**

**Filed Feb. 25, 1974, Ser. No. 445,385**
**Int. Cl. C10m** *1/38*
**U.S. Cl. 252—47** **5 Claims**

**1.** A composition comprising a major amount of a hydrocarbon oil of lubricating viscosity and between about 0.01 and 50 wt. % of a thiadiazole derivative mixture containing as a principal product an alkylidenimino thiadiazole characterized by the formula:



where R is alkyl of from 2 to 30 carbons, said thiadiazole derivative mixture prepared by the process comprising first contacting 2-amino-5-mercapto-1,3,4-thiadiazole with an alkanal of the formula RCHO where R is alkyl of from 2 to 30 carbons at a temperature of between about 20° and 250°C. utilizing a mole ratio of 2-amino-5-mercapto-1,3,4-thiadiazole to alkanal of between about 10:1 and 1:2 to form an intermediate thiadiazole product characterized by the formula:



and second contacting said thiadiazole intermediate with dimethyl sulfoxide at a temperature of between about 20° and 150°C. utilizing a mole ratio of said intermediate to said dimethyl sulfoxide of between about 3:1 and 1:50 to form said thiadiazole derivative mixture.

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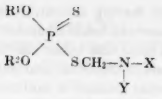
**3,865,740**
**MULTIFUNCTIONAL LUBRICATING OIL ADDITIVE**

**Alfred Goldschmidt, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 255,605, May 22, 1972, abandoned. This application Feb. 14, 1973, Ser. No. 332,864**
**Int. Cl. C10m** *1/48*
**U.S. Cl. 252—46.7** **5 Claims**

**5.** A lubricating oil composition containing an oil of lubricating viscosity and from 0.1 to 10 percent by weight of a lubricating oil additive of the general formula



wherein $R^1$ and $R^2$ are alkyl, aryl, alkaryl or aralkyl groups of from about one to 20 carbon atoms, and X and Y are radicals, one of which may be hydrogen, but at least one of which is a hydrocarbyl-substituted succinimide of a hydrocarbyl polyamine, and wherein said hydrocarbyl substituent contains at least 40 carbon atoms.

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**3,865,741**
**PROCESS FOR PRODUCING MAGNETIC TAPE COATING**

**Frederic J. Sischka, Santa Clara, Calif., assignor to Memorex Corp., Santa Clara, Calif.**

**Filed Nov. 7, 1973, Ser. No. 413,615**
**Int. Cl. H01j** *1/113*
**U.S. Cl. 252—62.54** **1 Claim**

**1.** In a process for producing a magnetic tape coating composition magnetic iron oxide particles dispersed in a resin mixture comprising a major proportion of a vinylidene chloride-acrylonitrile copolymer containing in excess of 50% by weight of vinylidene chloride and a minor proportion of a polyurethane resin the improvement which comprises milling a slurry of magnetic iron oxide having an appreciable content of ferrous iron in a solution of polyurethane resin for a time sufficient to produce a dispersion of magnetic iron oxide in the solution, which dispersion is substantially free of magnetic iron oxide agglomerates and then intimately mixing the dispersion with a solution of the vinylidene chloride-acrylonitrile polymer.

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**3,865,742**
**RESISTOR COMPOSITIONS**

**Bernard Greenstein, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed May 6, 1971, Ser. No. 140,988**
**Int. Cl. H01b** *3/02*; **H01h** *85/24*; **H01c** *17/00*
**U.S. Cl. 252—63.5** **26 Claims**

**1.** A resistor composition comprising a particulate zinc free, boron free, lead, barium silicate glass binder having a firing temperature of about 725°–775° C and a positive TCR, said glass binder being admixed with a substantially homogeneous finely divided, substantially chloride or cyanide salt-free powder comprised of at least one resistive metal selected from the group consisting of palladium, rhodium, iridium, ruthenium, indium and mixtures thereof, at least two stabilizer metals selected from the group consisting of silver, gold and platinum, and about 0.02–0.5 weight percent, related to the weight of the metal powder, of particulate $MnO_2$ to reduce the TCR of said resistor composition.

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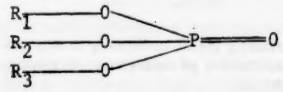
**3,865,743**
**FUNCTIONAL FLUIDS**

**Martin B. Sheratte, Reseda, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.**

**Filed May 1, 1972, Ser. No. 249,412**
**Int. Cl. C09k** *3/00*
**U.S. Cl. 252—78** **24 Claims**

**1.** A functional fluid composition consisting essentially of a base stock, said base stock consisting essentially of (1) a phosphate ester having the general formula:



where $R_1$, $R_2$ and $R_3$ are each a member selected from the group consisting of aryl, alkaryl, alkyl of from about 3 to about 10 carbon atoms, and alkoxyalkyl having from about 3 to about 8 carbon atoms, and (2) a polyalkylene glycol material having terminal groups selected from the class consisting of free hydroxyl and ether groups, said ether groups being oxyalkyl groups wherein the alkyl radicals contain from 1 to about 8 carbon atoms, said alkylene groups being selected from the class consisting of ethylene and propylene radicals, and mixtures thereof, said polyalkylene glycol material having a molecular weight ranging from about 500 to about 2,000, said phosphate ester being present in an amount ranging from about 15 to about 90%, and said glycol material being present in an amount ranging from about 10 to about 85%, by weight of said composition; and a small amount of organic iodo compound sufficient to enhance the autoignition temperature of said base stock, said iodo compound being selected from the group consisting of aryl and alkaryl mono, di and triodides, said aryl and alkaryl radicals containing from about 6 to about 15 carbon atoms.

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3,865,744

## METHOD OF PRODUCING COPPER AND COMPOSITION THEREFOR

**Alan James Parker; Winfield Earle Waghorne; Dion Ewing Giles; John Howard Sharp; Robert Alexander, and David Michael Muir, all of c/o The Research School of Chemistry, The Australian University, Canberra A.C.T., Australia (2600)**

**Filed Mar. 22, 1972, Ser. No. 237,061**

**Claims priority, application Australia, Apr. 2, 1971, 4500/71; Apr. 2, 1971, 4501/71; Apr. 2, 1971, 4502/71; Apr. 28, 1971, 4735/71; June 4, 1971, 5110/71; Sept. 14, 1971, 6281/71; Sept. 24, 1971, 6411/71; Oct. 20, 1971, 6718/71; Oct. 26, 1971, 6798/71; Dec. 14, 1971, 7383/71; Jan. 26, 1972, 7776/72**

**Int. Cl. C22b** *15/00, 15/08, 15/12*

**U.S. Cl. 252—188.3 R** **25 Claims**

1. A composition of matter comprising at least 15% by volume water, an acid selected from the group consisting of sulphuric, sulphurous and nitric acid, at least 4% by volume of an organic nitrile selected from the group consisting of acetonitrile, acrylonitrile, 2-hydroxycyanoethane and mixture thereof and a copper salt of the corresponding acid.

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3,865,745

## PROCESS FOR THE PREPARATION OF METAL CARBIDE AND METAL OXIDE MICROSPHERES

**Jacob Block, Rockville; Richard J. Herbst, Ellicott City, and Leonard V. Triggiani, Rockville, all of Md., assignors to W. P. Grace & Co., New York, N.Y.**

**Division of Ser. No. 106,879, Jan. 15, 1971, abandoned. This application Sept. 1, 1972, Ser. No. 285,942**

**Int. Cl. C01g** *43/00*

**U.S. Cl. 252—301.1 R** **8 Claims**

1. A process for preparing metal carbide microspheres having a carbon to metal ratio of about 1:1 to 15 to 1 which comprises:

a. exchanging anion exchange resin spheres or sulfur free cation exchange resin spheres with a solution of a soluble salt of a metal selected from the group consisting of the actinides, the rare earths and elements of group *Ib*, *IIb*, *IIIb*, *IVb*, *Vb*, *VIb* and *VIIb* of the periodic table,

b. washing to remove excess solution and drying,

c. heating the exchanged resin spheres at a temperature of 500° to 1100°C. in an atmosphere of steam, carbon dioxide or oxygen for a period of time sufficient to reduce the carbon to metal ratio to about 3:1 to 17:1,

d. heating to a temperature of 1200°C to 1400°C. in argon for 3 to 6 hours to effect carbothermal reduction,

e. sintering at a temperature of 1000° to 3000°C. for about 0.5 to 28 hours in hydrogen, an inert gas or under vacuum, and

f. recovering the metal carbide microspheres product.

3,865,746

## $UO_2$-BeO FUEL PROCESS

**Jack A. Rubin, Encino, and Peter D. Johnson, Chatsworth, both of Calif., assignors to The United States of America as represented by the U.S. Atomic Energy Commission, Washington, D.C.**

**Filed July 16, 1959, Ser. No. 827,661**

**Int. Cl. C09k** *3/00*

**U.S. Cl. 252—301.1 W** **4 Claims**

1. A method of forming a $UO_2$-BeO ceramic body which comprises melting together uranium nitrate and beryllium nitrate to a temperature of approximately 50°–100°C, heating the resulting melt until a homogeneous mixture of beryllium oxide and uranium oxide is obtained, hot-pressing the resulting composition at approximate conditions of 1,200°–2,000°C, at a pressure of 1,000 to 6,000 psi for one-half to six hours.

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3,865,747

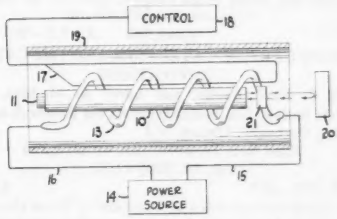
## Q-SWITCHING DEVICE FOR GLASS LASERS

**Charles B. Greenberg, Turtle Creek, Pa., assignor to PPG-Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 673,614, Oct. 9, 1967, abandoned. This application Aug. 21, 1970, Ser. No. 65,894**

**Int. Cl. H01s** *3/00;* **C09k** *1/30, 1/10*

**U.S. Cl. 252—301.1 L** **4 Claims**




1. A process for producing a self Q-switching device adapted for use in a laser comprising:

a. melting

i. a mixture consisting essentially of glass batch materials which are substantially iron-free, and which when melted and cooled form a glass which is suitable for laser applications,

ii. a uranium salt, and

iii. cerium dioxide, and

b. cooling said melt to form a solid glass, said uranium salt being present in said solid glass in an amount sufficient to provide a uranium salt being present in said solid glass in an amount sufficient to provide a uranium content, expressed as $UO_2^{+2}$, of 0.01 percent to 15 percent by weight, based on the weight of said solid glass and said cerium dioxide being present in an amount sufficient to convert at least 91 percent of said uranium to a $UO_2^{+2}$ valence state.

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3,865,748

## CINNAMYL PHENOL ANTIMICROBIAL AGENTS

**Leonard Jurd, Berkeley; A. Douglas King, Jr., Martinez, and William L. Stanley, Richmond, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 74,485, Sept. 22, 1970, Pat. No. 3,745,222. This application Apr. 17, 1973, Ser. No. 351,932**

**Int. Cl. A01n** *9/26;* **B01j** *1/18*

**U.S. Cl. 252—404** **1 Claim**

1. A composition of matter comprising

a. a major proportion of a substance normally subject to microbial spoilage, and

b. a minor proportion, sufficient to inhibit microbial growth, of 2-cinnamyl-5-methoxyquinol.

3,865,749

## BUTADIENE POLYMERIZATION CATALYST

Erik G. M. Tornqvist, Scotch Plains, and Charles Cozewith, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 30, 1973, Ser. No. 392,966The portion of the term of this patent subsequent to May 16, 1989, has been disclaimed.

Int. Cl. B01j *11/84*

U.S. Cl. 252—429 B 12 Claims

1. A hydrocarbon-soluble catalyst system for the polymerization of conjugated diolefins to produce a polymer having from 50 to about 90% trans-1,4 addition units, consisting essentially of:

a. $Ti(halide)_4$—$M_nI_m$ wherein the halide may be I, Cl, or Br; M is aluminum or tetravalent tin; $n$ is 0 or 1; m is the valence of M and when n is 0, $m$ is 2; and when the halide is I, $M_nI_m$ is omitted;

b. an aluminum alkyl having the formula $AlR_aX_{3-a}$ wherein R is an alkyl having 1 to 12 carbon atoms, X is Cl, Br or I, $a$ is a number 2 to 3, and the molar ratio of the aluminum alkyl to $Ti(halide)_4$—$M_nI_m$ being in the range from 20:1 to 1:1;

c. a Lewis base selected from the group consisting of tetrahydrothiophene, tetrahydrothiopyran, tetrahydrofuran, tetrahydropyran, 2-methyl tetrahydrothiophene and 2,5-dimethyl tetrahydrofuran, the mole ratio of Lewis base to $Ti(halide)_4$ being in the range of from 1:1 to 500:1.

3,865,750

## TITANIUM CARBIDE CATALYSTS, AND THE CATALYST COMPOSITIONS

Howard F. Rase, Austin, and Larry A. Maddox, Corpus Christi, both of Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 27, 1971, Ser. No. 212,376

Int. Cl. B01j *11/82*

U.S. Cl. 252—443 13 Claims

1. A catalyst comprising a composite of from about 0.1 to about 50 weight percent of a hydrogenation-dehydrogenation component consisting of a metal or an oxide or sulfide of a metal, or mixtures thereof, selected from the group consisting of nickel, molybdenum, iron, cobalt, rhodium, palladium, tungsten, rhenium and platinum and titanium carbide characterized as a stable phase solid of stoichiometry ranging from about $TiC_{0.52}$ to $TiC_{0.99}$.

3,865,751

## CATALYST FOR CONVERSION OF OLEFINS

Robert L. Banks, and Joseph R. Kenton, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 6,045, Jan. 26, 1970, Pat. No. 3,660,506, which is a continuation of Ser. No. 678,499, Oct. 27, 1967, abandoned, which is a continuation-in-part of Ser. No. 627,668, April 3, 1967, abandoned. This application Dec. 6, 1971, Ser. No. 205,350

Int. Cl. B01j *11/32, 11/42*

U.S. Cl. 252—457 4 Claims

1. A composition active for converting an olefin to obtain the product of the olefin reaction which, as defined herein, can be visualized as comprising the reaction between two first pairs of carbon atoms, the two carbon atoms of each first pair being connected by an olefinic double bond, to form two new pairs from the carbon atoms of said first pairs, the two carbon atoms of each of said new pairs being connected by an olefinic double bond comprising magnesium oxide admixed with a separate disproportionation catalyst selected from the group consisting of

silica gel or thoria promoted by an oxide or a compound convertible to the oxide by calcination of tungsten or molybdenum;

said magnesium oxide being present in an amount in the range of 0.1 to 20 parts by weight per part by weight of said disproportionation catalyst.

3,865,752

## CATALYST ACTIVATION PROCESS AND PRODUCT THEREOF

Joseph Peter Remeika, Warren Township, Somerset County; Rudolf Johannes H. Voorhoeve, Summit, both of N.J., and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 18, 1972, Ser. No. 316,255

Int. Cl. B01j *11/06*

U.S. Cl. 252—462 5 Claims

1. Activation procedure for increasing the catalytic activity of an unused catalyst containing an active ingredient which consists essentially of at least one composition within the atom formula $RE_{1-x}M_xM'O_3$, in which the amount of any of the three indicated cations may be reduced by up to about 15 atom percent to accommodate vacancy structures, in which RE is at least one element selected from the group consisting of La, Pr, and Nd, in which M is at least one element selected from the group consisting of Pb, Ca, Sr, and Ba, in which M' is at least one element selected from the group consisting of Mn and Cr, and in which $x$ is from 0.05 to 0.7, characterized in that such active ingredient is intimately contacted by a fluid within the pH range of from 0.5 to 6.0 for a time and at a temperature sufficient to remove at least 1% of the active ingredient.

3,865,753

## PROCESS FOR THE PREPARATION OF A NICKEL MAGNESIUM ALUMINUM CATALYST

Franz Josef Broecker, Ludwigshafen; Knut Kaempfer, Frankenthal; Laslo Marosi, Speyer; Matthias Schwarzmann, Limburgerhof, and Bruno Triebskorn, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft Ludwigshafen/Rhine, Germany

Filed June 25, 1973, Ser. No. 373,012

Claims priority, application Germany, June 27, 1972, 2231367

Int. Cl. B01j *11/22*

U.S. Cl. 252—466 J 2 Claims

1. A catalyst in the production of which the compound $Ni_5MgAl_2(OH)_{16}CO_3.4H_2O$ is prepared as the catalyst precursor from aqueous solution, dried within the temperature range from 80° to 180° C, calcined within the range from 350° to 550° C and then reduced in a stream of hydrogen, the rise in temperature between the drying stage and the calcination stage being carried out with a gradient within the range from 1.66° C per minute to 3.33° C per minute.

3,865,754

## CRYSTALLIZATION SEED-CONTAINING DETERGENT COMPOSITION

Russell Norris, and Charles R. Woodiwiss, both of Cincinnati, Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio

Filed Oct. 27, 1972, Ser. No. 301,384

Int. Cl. C11d *3/065*

U.S. Cl. 252—532 13 Claims

1. Detergent compositions capable of rapidly reducing the free polyvalent metal ion content of an aqueous solution when added thereto, said compositions consisting essentially of:

a. from 0.1% to about 10% by weight of alkali metal aluminates having an alkali $metal_2O/Al_2O_3$ mole ratio of from about 2:1 to 1:2;

b. from about 10% to about 80% by weight of a material capable of forming, at a pH of 6 or above, a water-insoluble reaction product with free polyvalent metal ions, said water-insoluble reaction product having a solubility in water of less than $1.4 \times 10^{-2}$ weight percent at 25° C.;

c. from about 5% to about 50% by weight of a water-soluble organic detergent selected from the group consisting of anionic, nonionic, ampholytic and zwitterionic detergents and mixtures thereof; and

d. from about 5% to about 35% by weight of a crystallization seed capable of providing growth sites in aqueous

silution for the reaction products of (a) and (b), said crystallization seed having a particle size of from 0.01 micron to 5.0 microns.

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3,865,755

## DETERGENT COMPOSITION

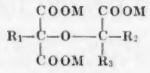
Kent P. Lannert, Freeburg, Ill., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 253,357, May 15, 1972, , which is a continuation-in-part of Ser. Nos. 158,577, June 30, 1971, , and Ser. No. 158,540, June 30, 1971, abandoned. This application Sept. 13, 1973, Ser. No. 396,928

Int. Cl. C11d *1/12*

U.S. Cl. 252—558 12 Claims

1. A detergent composition comprising at least 8 percent by weight of a surfactant selected from the group consisting of anionic, nonionic, zwitterionic, ampholytic and amphoteric surfactants and from 1 percent to 75 percent by weight of a detergency builder compound having the formula



wherein M is selected from the group consisting of alkali metals and ammonium and $R_1$ and $R_2$ are each selected from the group consisting of hydrogen, methyl and ethyl and $R_3$ is selected from the group consisting of hydrogen, methyl, ethyl and COOM.

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3,865,756

## CLEANING COMPOSITION

Timothy J. C. Smith, Lansdale, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Filed Aug. 14, 1972, Ser. No. 280,094

Int. Cl. C11d *3/16*; Clld *3/18*; C11d *3/075*

U.S. Cl. 252—529 20 Claims

1. A cleaning composition consisting essentially of:

A. about 55 to about 90 wt. % of an organic cleaning solvent selected from the class consisting of low molecular weight alcohols, mineral spirits, halogenated hydrocarbons and high boiling ethers;

B. about 1 to about 5 wt. % of a powdered gelling agent having abrasive properties, said gelling agent being colloidal silica having a particle size within the range of about 0.005 to about 0.05 micron;

C. about 1 to about 10 wt. % of a wetting agent selected from the class consisting of non-ionic, anionic, cationic and amphoteric surfactants;

D. about 1 to about 15 wt. % of an alkaline cleaning agent selected from the class consisting of alkanolamines, caustic soda, soda ash and water soluble metal silicates and phosphates;

E. 0 to about 20 wt. % of a powdered abrasive having a larger particle size than said powdered gelling agent.

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3,865,757

## SELF-EXTINGUISHING RESINOUS FOAMS

Robert C. Wade, Ipswich, Mass., assignor to Resitron Corporation, Beverly, Mass.

Filed Mar. 26, 1973, Ser. No. 345,018

Int. Cl. C08g *22/44*, *22/16*, *41/04*

U.S. Cl. 260—2,5 AR 5 Claims

1. A self extinguishing resinous foam containing at least about 1.5% by weight of phosphorus and consisting essentially of the polymerization product of a reaction mixture containing (a) a furan compound selected from the group consisting of furfuryl alcohol and furfuryl alcohol resins, (b) from about 12 to about 125 parts by weight per 100 parts by weight of the furan compound of an isocyanate compound selected from the group consisting of hexamethylene diisocyanate, phenylene diisocyanate, tolylene diisocyanate (TDI), 4,4'-diphenylmethane diisocyanate (MDI), xylylene diisocyanate, naphthalene diisocyanates, triphenylmethane triisocyanate, polymethyl polyphenyl polyisocyanates obtained by phosgenation of aniline-formaldehyde and (c) from about 15 to about 40 parts by weight per 100 parts by weight of the furan compound of a phosphorous-containing inorganic acid selected from the group consisting of orthophosphoric acid, metaphosphoric acid, pyrophosphoric acid, polyphosphoric acids, orthophosphorous acid, hypophosphorous acid and complexes thereof with an alcohol compound selected from the group consisting of a poly(oxypropylene) adduct of trimethylolpropane, a propylene oxide adduct of pentaerythritol, diethyl N,N-bis(2-hydroxyethyl)amine methyl phosphonate, sorbitol and propylene glycol.

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3,865,758

## POLYURETHANE FOAM FILTER MATERIAL CONTAINING ADSORBENT AND METHOD OF PRODUCTION THEREOF

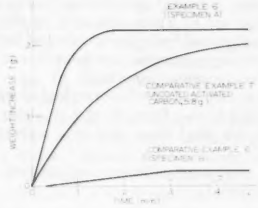
Norio Yoshida; Yoshihiko Imanaka, both of Osaka, and Kiyoji Katayama, Tokyo, all of Japan, assignors to Teijin Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 288,390, Sept. 12, 1972, abandoned. This application Dec. 27, 1973, Ser. No. 428,627

Claims priority, application Japan, Sept. 13, 1971, 46-71548

Int. Cl. C08g *22/44*, *51/08*

U.S. Cl. 260—2.5 AK 2 Claims




1. In a method of producing a polyurethane foam filter material containing activated carbon which comprises reacting a polyurethane foam-forming composition comprising a isocyanate and a polyester or a polyether in the presence of particles of activated carbon, a small amount of water, and a catalyst;

the improvement comprising (a) carrying out the reaction in the presence of pre-coated particles of the activated carbon coated with a solid film of a film-forming polymeric material selected from the group consisting of starch, gelatin, sodium alginate, tragacanth gum, locust bean gum, methyl cellulose, ethyl cellulose, carboxymethyl cellulose, hydroxyethyl cellulose, cellulose acetate, polyalkylene oxides, polystyrene, polyvinyl alcohol, polyvinyl methyl ether and polyalkylacrylates, which coating does not dissolve the polyurethane foam and can be removed after formation of the polyurethane foam by application of solvent, wherein the amount of the polymeric material is in the range of 1 to 10 % by weight of said adsorbent, and the amount of the adsorbent particles is at least 2 % by weight based on the weight of the polyurethane formed, and (b) removing the coated film-forming polymeric material from the formed polyurethane by the application of solvent which dissolves the polymeric material and does not substantially dissolve the polyurethane foam.

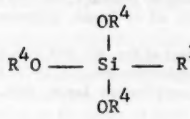
## 3,865,759
## ROOM TEMPERATURE VULCANIZING SILICONE COMPOSITIONS

Robert A. Smith, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

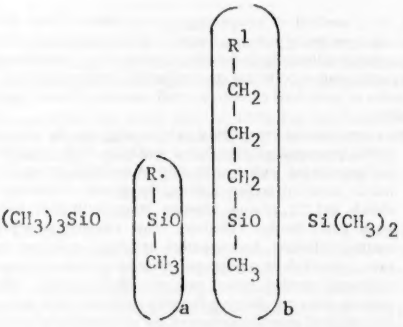
Filed Jan. 10, 1974, Ser. No. 432,409
Int. Cl. C08g 53/10
U.S. Cl. 260—2.5 B 13 Claims

1. An injectable catalyzed composition curable to a low density, high compressive strength foam, said composition comprising:

1. a low density filler comprising hollow microspheres;
2. a linear fluid organopolysiloxane containing terminal silicon-bonded hydroxy groups, convertible to a cured solid state, alone, or in admixture with a linear, fluid organopolysiloxane having a 1:1 ratio of terminal silicon-bonded triorganosilyloxy to terminal silicon-bonded hydroxy groups, convertible to a cured solid state;
3. an alkyl silicate selected from (a) a monomeric organosilicate corresponding to the general formula:



wherein $R^4$ is alkyl, haloalkyl, aryl, haloaryl, alkenyl, cycloalkyl or cyanoalkyl, and $R^3$ is the same as $R^4$ or alkoxy or aryloxy or (b) a liquid partial hydrolysis product of the aforementioned organosilicate monomeric compounds; and
4. a catalyst composition comprising:
   i. a stannous carboxylate of a branched chain alkyl carboxylic acid having from about 8 to about 12 carbon atoms in the alkyl chain; and as a stabilizing carrier therefor,
   ii. a fluid organopolysiloxane composition having an average formula:



where R is a higher alkyl radical, $R^1$ is selected from the class consisting of monovalent and divalent hindered t-butyl-substituted hydroxyaryl radicals, the sum of *a* plus *b* is from 5 to 40, inclusive, and the ratio of *b* over the sum of *a* plus *b* is from 0.005 to 0.1, inclusive.

## 3,865,760
## FLAME RETARDANT MATERIALS

Frank Pitts, Kersal, and Michael Hilton Clubley, Bolton, both of England, assignors to Magnesium Elektron Limited, Swinton, Manchester, England

Filed July 30, 1973, Ser. No. 383,544
Claims priority, application Great Britain, Aug. 7, 1972, 36726/72
Int. Cl. C08c 17/08
U.S. Cl. 260—2.5 AJ 10 Claims

1. A composition consisting essentially of rubber and a flame-retarding agent comprising an inorganic compound containing calcium and borate radicals in an amount sufficient to impart significant flame retardency to said composition.

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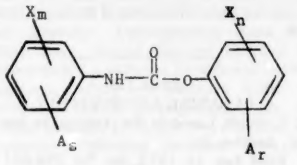
## 3,865,761
## FLAME RETARDANT POLYURETHANE FOAM

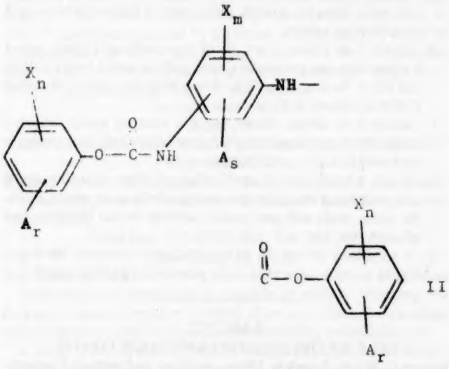
Wilhelm J. Schnabel, Branford, Conn., assignor to Olin Corp., New Haven, Conn.

Filed Aug. 10, 1973, Ser. No. 387,537
Int. Cl. C08g 22/44, 51/60
U.S. Cl. 260—2.5 AJ 13 Claims

1. A process for preparing a flexible polyurethane foam from a reaction mixture which comprises a polyol, an organic polyisocyanate, a foaming agent, a reaction catalyst and a flame retarding amount of a halogenated aromatic carbamate represented by formula I or formula II as follows:



I



II

wherein, as applied to each of said formulas I and II;
each A is independently an alkyl group of 1–12 carbon atoms,
*r* is an integer from 0 to 3,
*s* is an integer from 0 to 3,
each X is independently a halogen selected from chlorine and bromine,
*m* is an integer of 0–5 as applied to said formula I and 0–4 as applied to said formula II, and
*n* is an integer from 0 to 5,
with the proviso that the sum of $m + n$ is at least 1.

3,865,762

## FLEXIBLE POLYURETHANE FOAMS PREPARED BY THE USING A MIXTURE OF POLYETHER-POLYOLS AND MIXTURE OF POLYISOCYANATES

Gerard Repiquet, Martigues, and Jean Claude Crouzet, Avignon, both of France, assignors to Naphtachimie, Paris, France

Continuation of Ser. No. 139,226, April 30, 1971, abandoned. This application Oct. 29, 1973, Ser. No. 410,689

Claims priority, application France, Apr. 15, 1970, 70.13615

Int. Cl. C08g *22/46*

U.S. Cl. 260—2.5 AP 15 Claims

1. Flexible polyurethane foams having a density less than 50 g/l prepared by casting in a mold in which the foam is crosslinked at ambient temperature without the necessity of thermal curing a foaming mixture comprising (1) at least one polyether-polyol having an equivalent molecular weight within the range of 1000 to 2000 and an average functionality within the range of 2.5 to 6, prepared by condensing a polyol first with an alkylene oxide containing at least 3 carbon atoms and then with ethylene oxide, with the ethylene oxide constituting from 10 to 30% by weight of the oxides condensed with the polyol; (2) 2 to 30% by weight, based on the weight of (1), of a polyether-polyol having an equivalent molecular weight within the range of 75 to 1000 and an average functionality from 2 to 3, prepared by condensation of ethylene oxide or a mixture of ethylene oxide with at least one other alkylene oxide in which at least 25% by weight of the mixture is ethylene oxide with a material selected from the group consisting of water, a glycol and a triol; (3) at least one organic polyisocyanate containing 2 to 4 benzene nuclei with each nucleus containing at least one isocyanate grouping; (4) 10 to 80% by weight, based on the weight of (3), of a tolylene diisocyanate; and (5) a blowing agent; and removing the molded foam, with the ratio of the total NCO groups of (3) and (4) to the total of the hydroxyl groups of (1) and (2) being within the range of 0.6 to 1.5.

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3,865,763

## SCORCH RETARDERS FOR HALAOGENATED BUTYL

George Feniak, Wyoming, Ontario, Canada, assignor to Polysar Limited, Sarnia, Ontario, Canada

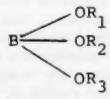
Filed Aug. 20, 1973, Ser. No. 389,518

Claims priority, application Canada, Sept. 28, 1972, 152817

Int. Cl. C08c *9/08*

U.S. Cl. 260—5 11 Claims

1. The method of retarding scorch in a vulcanizable composition containing a halogenated butyl rubber selected from the group consisting of brominated butyl rubber and chlorinated butyl rubber characterized in that said vulcanizable composition is admixed with an amount sufficient to retard scorch of a compound of boron having at least one atom of oxygen chemically bonded to boron and selected from boric oxide, boric acid and a boron compound of the general formula



wherein $R_1$, $R_2$ and $R_3$ are hydrocarbyl radicals having 1 to 12 carbon atoms.

3,865,764

## RESIN BINDER COMPOSITIONS

Arthur H. Drelich, Plainfield, and Bobby R. Bowman, East Brunswick, both of N.J., assignors to Johnson and Johnson, New Brunswick, N.J.

Division of Ser. No. 176,306, Aug. 30, 1971, Pat. No. 3,821,146, which is a continuation-in-part of Ser. No. 109,026, Jan. 22, 1971, Pat. No. 3,706,595. This application Dec. 12, 1973, Ser. No. 424,123

Int. Cl. C08f *45/00*; C08g *51/00*

U.S. Cl. 260—17 R 2 Claims

1. A colloidal synthetic resin binder composition for bonding a fibrous web of overlapping, intersecting fibers which comprises: a stable, colloidal aqueous dispersion having an alkaline pH comprising: (1) from about 0.1% to about 60% by weight on a solids basis of a colloidal synthetic resin; (2) from about 0.05% by weight to about 7% by weight, based on the weight of said colloidal synthetic resin of a sodium salt of carboxymethylcellulose as a water-soluble, polymeric carboxylic synthetic resin thickener; and (3) from about 0.01% by weight to about 5% by weight, based on the weight of said colloidal synthetic resin of a metal ammine complex coordination compound, having the formula Me $(NH_3)_xY$ wherein Me is a metal, $x$ is a whole number from 2 to 8, and Y is an anion, said metal being selected from the group consisting of chromium, nickel, zinc, and copper.

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3,865,765

## RESIN BINDER COMPOSITIONS

Arthur H. Drelich, Plainfield, and Bobby R. Bowman, East Brunswick, both of N.J., assignors to Johnson and Johnson, New Brunswick, N.J.

Division of Ser. No. 176,306, Aug. 30, 1971, Pat. No. 3,821,146, which is a continuation-in-part of Ser. No. 109,026, Jan. 22, 1971, Pat. No. 3,706,595. This application Dec. 12, 1973, Ser. No. 424,022

Int. Cl. C08f *45/00*; C08g *51/00*

U.S. Cl. 260—17.4 ST 2 Claims

1. A colloidal synthetic resin binder composition for bonding a fibrous web of overlapping, intersecting fibers which comprises: a stable, colloidal aqueous dispersion having an alkaline pH comprising: (1) from about 0.1% to about 60% by weight on a solids basis of a colloidal synthetic resin; (2) from about 0.05% by weight to about 7% by weight, based on the weight of said colloidal synthetic resin of a sodium salt of an alginate polymer as a water-soluble, polymeric carboxylic synthetic resin thickener; and (3) from about 0.01% by weight to about 5% by weight, based on the weight of said colloidal synthetic resin of a metal ammine complex coordination compound, having the formula Me $(NH_3)_x$ Y wherein Me is a metal, $x$ is a whole number from 2 to 8, and Y is an anion, said metal being selected from the group consisting of chromium, nickel, zinc, and copper.

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3,865,766

## PROCESS FOR BODYING ORGANOPOLYSILOXANES

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Dec. 14, 1973, Ser. No. 424,774

Int. Cl. C08g *51/72*

U.S. Cl. 260—18 S 26 Claims

1. A process for effecting the controlled condensation of silanol radicals in a silanol-containing organopolysiloxane, which comprises

1. heating at a temperature between 50°C. and 250°C., a mixture comprising said silanol-containing organopolysiloxane, diatomaceous earth in an amount of from 0.75 to 20% by weight of said silanol-containing organopolysiloxane and a metal soap catalyst in an amount of from 0.0005 to 0.002%, calculated as metal, by weight of said silanol-containing organopolysiloxane; and
2. recovering an organopolysiloxane from the resulting mixture of (1), having a viscosity higher than said silanol-

containing organopolysiloxane which has an average ratio of from 1 to 1.8 organo radicals per silicon atom, selected from the group consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals.

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**3,865,767**

## POLYMER COMPOSITION DEGRADABLE UNDER THE INFLUENCE OF ULTRAVIOLET LIGHT AND/OR SUNLIGHT

**Anders Boberg, Jonkoping, Sweden, assignor to Akerlung & Rausing, Lund, Sweden**

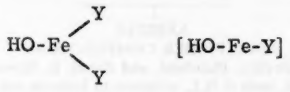
**Filed Sept. 13, 1972, Ser. No. 288,604**

**Claims priority, application Sweden, Sept. 14, 1971, 11625/71**

**Int. Cl. C08f** *21/04*

**U.S. Cl. 260—23 H** **5 Claims**

1. A polymer composition having an enhanced susceptibility to degradation under ultraviolet light and/or sunlight comprising an -olefin polymer and an amount within the range from about 0.01 to about 2 percent by weight of an iron compound capable of enhancing the susceptibility of the polymer to degradation under ultraviolet light and/or sunlight and having the general formula



in which Y is an anion of an aliphatic monocarboxylic acid having from about 6 to about 25 carbon atoms.

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**3,865,768**

## AQUEOUS FIBER GLASS SIZING COMPOSITION

**John Gilbert Mohr, Maumee, Ohio, assignor to Johns-Manville Corporation, Greenwood Village, Colo.**

**Filed June 25, 1973, Ser. No. 373,329**

**Int. Cl. C08f** *45/50*; **C03c** *25/02*

**U.S. Cl. 260—23 AR** **10 Claims**

1. A glass fiber sizing composition having a degree of lubricity appropriate to formation of roving and compatible with polyester mixes, which consists of: 0.5 to 15.0 weight percent of a poly(vinyl acetate) latex film former having a solids content of about 50-60 percent, a particle size in the range of about 0.25 to 0.35 micron and a pH in the range of 4.5 to 5.0; 0.01 to 0.6 weight percent of a polyester compatible silane; 0.01 to 1.0 weight percent of at least one alkyl amide reaction product of a $C_5$ to $C_{20}$ alkyl carboxylic acid and an ethylene amine; 0.05 to 0.5 weight percent of a nonionic surfactant derived from hydrogenated fatty acid containing oil; and the balance comprising deionized water; said glass fiber size composition having a pH in aqueous solution in the range of from 4 to 6.

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**3,865,769**

## AQUEOUS PAPER SIZE COMPOSITION CONTAINING HYDROCARBON RESIN AND FORTIFIED ROSIN

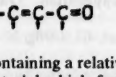
**Robert W. Davison, 616 Northside Dr., North Hills, Del. 19809**

**Continuation of Ser. No. 117,812, Feb. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 811,188, March 27, 1969, Pat. No. 3,565,755, which is a continuation-in-part of Ser. No. 522,361, Jan. 24, 1966, abandoned. This application Feb. 15, 1973, Ser. No. 332,866**

**Int. Cl. C09j** *3/26*

**U.S. Cl. 260—27 R** **20 Claims**

1. An essentially stable aqueous suspension of finely divided particles adapted for use as a paper size composition, the particles of the suspension being a blend consisting essentially of (A) from about 10 percent to about 65 percent of a non-crystalline thermoplastic synthetic nonadducted hydrocarbon resin having a ring and ball softening point of from about 45 C. to about 150 C., a molecular weight of from about 350 to about 2,000, and an acid number of less than about 1, and (B) from about 90 percent to about 35 percent of rosin-base material selected from the group consisting of fortified rosin and unfortified rosin-fortified rosin mixture, the fortified rosin being adduct reaction product of rosin and an acidic compound containing the



group, said suspension containing a relatively small amount of saponified rosin-base material which functions as dispersing agent for the dispersion, the amount thereof being equivalent to about .015 to about 0.5 milliequivalents of saponified carboxyl per gram of total solids of the suspension, the total solids of the aqueous suspension consisting essentially of the saponified rosin-base material and the finely divided particles, the total solids being from about 5 percent to 60 percent, by weight of the aqueous suspension, and the amount of adducted acidic compound being from about 2 percent to about 12 percent of the total solids weight.

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**3,865,770**

## WATER-DISPERSIBLE PRESSURE-SENSITIVE ADHESIVE, TAPE MADE THEREWITH, AND NOVEL TACKIFIERS THEREFOR

**Frederick D. Blake, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Dec. 1, 1972, Ser. No. 311,118**

**Int. Cl. C09j** *3/14*, *3/26*

**U.S. Cl. 260—27 R** **14 Claims**

1. Normally tacky and pressure-sensitive water-dispersible adhesive comprising:

a. a copolymer of monomers consisting essentially of
   1. about 90–20 parts by weight monomeric acrylic acid ester of non-tertiary alkyl alcohol the molecules of which have 1 to 4 carbon atoms; and
   2. about 10–80 parts by weight vinyl carboxylic acid monomer copolymerizable with said acrylic acid ester, at least a number of the carboxyl groups in said acid monomers sufficient to constitute about 3–22% the weight of said copolymer, having been neutralized by reaction with a secondary or tertiary alkanolamine containing at least 4 carbon atoms; and

b. 0–400 parts by weight, sufficient to render said adhesive water-dispersible and to impart thereto a rolling ball tack value of no more than 20 inches, of at least one water-dispersible tack-promoting material selected from the class consisting of the oily plasticizing water-soluble polyoxyethylene compounds and the tackifying reaction products of acid rosins and alkanolamines.

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**3,865,771**

## CORROSION RESISTANT AND FLEXIBLE AQUEOUS COATINGS

**Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.**

**Filed Nov. 27, 1972, Ser. No. 309,654**

**Int. Cl. C08g** *51/24*

**U.S. Cl. 260—29.3** **17 Claims**

1. An aqueous thermosetting coating composition comprising water having stably dispersed therein with the aid of a base, an hydroxy functional acidic resin having an acid value of from about 12 to about 150 and which is an adduct of a copolymer of at least 60 percent of styrene or vinyl toluene and at least 15 percent by weight of alpha, beta-monoethylenic unsaturated carboxylic acid with a stoichiometric deficiency of long straight chain olefin monoepoxide containing at least 12 carbon atoms, there being at least 15 percent by weight of said monoepoxide based on the copoly-

mer, there being further dispersed in said water from 5–40 percent, based on the total weight of resin, of a heat-hardening formaldehyde condensate selected from the group consisting of aminoplast resins and water-dispersible phenolic resins.

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**3,865,772**

**POLYMERIZATION PROCESS**

**Ramchandra K. Hulyalkar, Oakland, N.J., assignor to Dart Industries, Inc., Los Angeles, Calif.**

**Filed Dec. 5, 1973, Ser. No. 422,115**

**Int. Cl. C08f *1/00; C08f 15/02; C08f 15/40***

**U.S. Cl. 260—29.7 H** **10 Claims**

1. A process for the production of a copolymer from at least one hydrophobic monomer and at least one hydrophilic monomer which comprises:

a. charging all of the hydrophilic monomer selected from at least one ethylenically unsaturated monocarboxylic or polycarboxylic acid and at least a portion of the hydrophobic monomer selected from alpha-olefins, water insoluble vinyl monomers, conjugated dienes or mixtures thereof such that the weight ratio of hydrophobic to hydrophilic monomer is at least above 1:1;

b. reacting under bulk polymerization conditions said monomers to produce a reaction mixture containing a prepolymer amounting to between about 5 and about 25 percent by weight based on the total monomers charged to the process;

c. converting the reaction mixture to an emulsion;

d. further polymerizing the reaction mixture in the presence of a water soluble catalyst under emulsion polymerization conditions to convert at least 60 percent by weight of the total monomers charged to the process;

the amount of hydrophobic monomer charged to the process ranging from above about 50 to about 99 percent by weight of the total monomers.

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**3,865,773**

**AQUEOUS DISPERSION OF (1) ORGANOPOLYSILOXANE AND (2) ALLYL ALCOHOL—ACRYLAMIDE COPOLYMER AS PAPER COATING**

**Jean Dumoulin, Villerubanne, France, assignor to Rhone-Poulenc S.A., Paris, France**

**Filed July 6, 1973, Ser. No. 377,040**

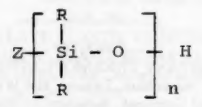
**Claims priority, application France, July 5, 1972, 72.24701**

**Int. Cl. C08f *45/24***

**U.S. Cl. 260—29.6 NR** **4 Claims**

1. An aqueous dispersion, consisting essentially of, per 100 parts of water, 1 to 5 parts by weight or a water soluble film forming copolymer of 5 to 40 mol percent allyl alcohol and 60 to 95 mol percent acrylamide and 2 to 10 parts by weight of an organopolysiloxane which is a mixture consisting essentially of

a. 60 to 98 percent by weight of an organopolysiloxane of the formula:



in which the symbols R independently represent an alkyl radical with 1 to 4 carbon atoms or a phenyl radical, the symbol Z represents a hydroxyl group or an —R group and *n* is an integer of 10 – 100,000,

b. 2 to 40 percent by weight of a organopolysiloxane selected from the group consisting of:

i. an organohydrogenopolysiloxane of the formula (a) $(R)_sH_tSiO_{(4-s-t)/2}$ 1 −0.75 −*value of* 5+ in which R is as defined in (A) above, the average value of s is 1– 1.5, the average value of t is 0,75– 1.25 and the average valueof the sum *s't* is 2–2.25,

ii. an organopolysiloxane resin consisting essentially of repeating units of the formula $(R)_2SiO$ and $RSiO_{3/2}$ in which R is as defined in (a) above, the respective proportions of the said units being such that the number of —R groups bonded to a silicon atom is 1.05 – 1.4, and

iii. a polyalkyl silicate, and

c. a curing agent for the siloxane or silicate present in an amount of 0.05 to 10 percent of the weight of polysiloxane (a).

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**3,865,774**

**PORCELAIN-LIKE COMPOSITION**

**Laurence A. Malone, 2111 Jefferson Davis Hwy., Apt. 220S, Arlington, Va. 22202**

**Filed Apr. 9, 1974, Ser. No. 459,387**

**Int. Cl. C08f *45/04***

**U.S. Cl. 260—29.6 S** **9 Claims**

1. A composition capable of hardening into a hard, porcelainlike material and comprising:

a first component comprising from 5.5 to 8 percent by weight of calcium oxide; from 45–75 percent by weight of potassium silicate; from 5.5 to 11 percent by weight of sodium oxide; from 12 to 21 percent by weight of alumina; and from 1 to 40 percent by weight of zinc oxide, the percentages by weight being based on the total amount of said first component; and

a second component in an amount of from 30 to 70 percent by volume, based on the total volume of the first and second components, and comprising from 30 to 50 percent by weight of polyvinyl acetate resin; from 8 to 15 percent by weight of polyvinyl alcohol resin; from 30 to 50 percent by weight of water; from 2 to 10 percent by weight of an alkanolamine having an alkyl group of up to 5 carbon atoms, and from 2 to 10 percent by weight of a plasticizer for polyvinyl acetate resin;

the solid ingredients of said composition being in the form of particles at least 50 percent by weight of which are less than 10 mesh, U.S. sieve size.

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**3,865,775**

**RESIN BINDER COMPOSITIONS**

**Arthur H. Drelich, Plainfield, and Bobby R. Bowman, East Brunswick, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Division of Ser. No. 176,306, Aug. 30, 1971, Pat. No. 3,821,146, which is a continuation-in-part of Ser. No. 109,026, Jan. 22, 1971, Pat. No. 3,706,595. This application Dec. 12, 1973, Ser. No. 424,139**

**Int. Cl. C08d *9/08; C08f 45/00***

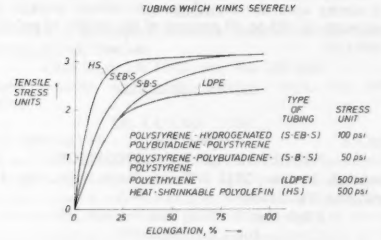
**U.S. Cl. 260—29.7 M** **4 Claims**

1. A colloidal synthetic resin binder composition for bonding a fibrous web of overlapping, intersecting fibers which comprises: a stable, colloidal aqueous dispersion having an alkaline pH comprising: (1) from about 0.1% to about 60% by weight on a solids basis of a terpolymer of butadiene, styrene, and an a,b-unsaturated carboxylic acid as a colloidal synthetic resin; (2) from about 0.05% by weight to about 7% by weight, based on the weight of said colloidal synthetic resin of a water-soluble, polymeric carboxylic synthetic resin thickener; and (3) from about 0.01% by weight to about 5% by weight, based on the weight of said colloidal synthetic resin of a metal ammine complex coordination compound, having the formula $Me(NH_3)_xY$ wherein Me is a metal, *x* is a whole number from 2 to 8, and Y is an anion, said metal bieng selected from the group consisting of chromium, nickel, zinc, and copper.

## 3,865,776
## KINK-RESISTANT POLYMERIC TUBING

William P. Gergen, Garden Grove, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 11, 1974, Ser. No. 441,722
Int. Cl. C08c *11/22*; C08f *15/04*
U.S. Cl. 260—33.6 AQ 4 Claims




1. A composition comprising:
a. 50–100 parts by weight of a block copolymer having at least two monoalkenylarene polymer blocks and at least one substantially completely hydrogenated conjugated diene polymer block, said copolymer comprising 31–35 wt. percent by weight monoalkenylarene polymer block content, each of said monoalkenylarene blocks having an average molecular weight between about 20,000 and 35,000;
b. 5–50 parts by weight of a block copolymer having at least two monoalkenylarene polymer blocks and at least one substantially completely hydrogenated conjugated diene polymer block, said copolymer comprising **26-31** wt.% monoalkenylarene polymer block content, each of said monoalkenylarene blocks having an average molecular weight between about 8,000 and 15,000;
c. 75–250 parts by weight of a mineral white oil;
d. 25–50 parts by weight of a polypropylene having a melt flow between about 8 and 14 dg/min.; and
e. 10–35 parts by weight of a resin, said resin being compatible with either the monoalkenylarene polymer blocks or the diene polymer block, and having a softening point higher than 100°C of exhibiting crystallinity.

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## 3,865,777
## CURING OF POLYEPOXIDE BASED FOUNDRY CORES WITH A CURING AGENT CONTAINING A LIQUID HYDROCARBON AND A BORON TRIFLUORIDE COMPLEX

Clifford V. Wittenwyler, Cherry Hill, N.J., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 336,860, Feb. 28, 1973, abandoned. This application Feb. 25, 1974, Ser. No. 445,187
Int. Cl. C08g *51/04*
U.S. Cl. 260—37 EP 23 Claims

1. A process for preparing foundry cores which comprises
a. blending about 90 to 99 parts by weight of foundry sand with from about 1 to 10 parts by weight of a liquid polyepoxide binder;
b. mixing sand blend of (a) with a curing amount of a curing agent consisting essentially of
about 5 to 50 percent by weight of an organic boron trifluoride complex blended with
about 50 to 95 percent by weight of a high boiling, substantially aromatic, liquid hydrocarbon and with
optionally up to about 26 percent by weight of a polyoxyethylene surfactant;
c. packing the mixture of (b) into suitable molds; and
d. allowing the mixture to cure at ambient temperatures.

## 3,865,778
## HEAT VULCANIZABLE SILICONE RUBBER COMPOSITIONS RESISTANT TO OIL DEGRADATION

George Christie, Loudonville, N.Y., assignor to General Electric Company, New York, N.Y.

Filed Feb. 7, 1974, Ser. No. 440,377
Int. Cl. C08g *51/04*
U.S. Cl. 260—37 SB 20 Claims

1. A heat vulcanizable silicone rubber composition being resistant to degradation by hydrocarbon oils and having a specific gravity in the cured state of 1.20 to 1.70 comprising
a. 100 parts of organopolysiloxane polymer and blends of organopolysiloxane polymers having a viscosity of 1,000,000 to 200,000,000 centipoise at 25°C of the formula,
$(R)_a SiO_{4-a/2}$
b. from 0.1 to 10 parts of a curing catalyst selected from the class consisting of organic peroxides and high energy electron radiation,
c. from 25 to 60 parts of a silica filler selected from the class consisting of fumed silica and precipitated silica and mixtures thereof;
d. from 5 to 80 parts of an inert organic filler selected from the class consisting of titanium, iron oxide, aluminum oxide, diatomaceous earth, calcium carbonate, ground silica, quartz, diatomaceous silica, aluminum silicate, zinc oxide, zirconium silicate, barium sulphate, zinc sulfide, aluminum silicate, finely divided silica having surface-bonded alkoxy groups and mixtures thereof;
e. from 0.1 to 15 parts of an ingredient selected from the class consisting of MgO and mixtures of MgO of various particle sizes, where R is selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, a varies from 1.95 to 2.01, inclusive.

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## 3,865,779
## PROCESS FOR PREPARING REINFORCING ADDITIVES TO BE APPLIED TO INORGANIC CEMENTS

Seigo Oya, Kyoto; Hiroo Noro, Akashi, and Kisaburo Suzuki, Kyoto, all of Japan, assignors to Hiromichi Murata, Kobeshi, Hyogo-ken, Japan

Continuation-in-part of Ser. No. 11,322, Feb. 13, 1970, abandoned. This application May 5, 1972, Ser. No. 250,821
Int. Cl. C08f *45/04*, *45/16*
U.S. Cl. 260—42.44 3 Claims

1. An organic cement reinforcing additive in fiber form consisting essentially of:
a polyvinylchloride matrix having uniformly dispersed therein:
a. 30 to 60 parts by weight per 100 parts by weight of said polyvinylchloride and one or more inorganic powdered materials stable at 300°C, having a particle size of 5 to 50 microns
and
b. 0.1 to 3.0 parts by weight per 100 parts by weight of said polyvinylchloride of a hydrophylic surfactant;
said fiber having a thickness of 50 to 300 denier and a length of 5 to 100 mm,
the particles of said inorganic powdered material protruding through the surface of said fiber.

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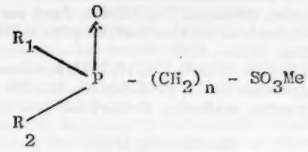
## 3,865,780
## FLAME RESISTANT THERMOPLASTIC POLYESTERS

Walter Herwig, Neuenhain, Taunus, and Werner Racky, Wiesbaden, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Aug. 1, 1973, Ser. No. 384,426
Claims priority, application Germany, Aug. 3, 1972, 2238222
Int. Cl. C09k *3/28*
U.S. Cl. 260—45.7 PS 4 Claims

1. A flame resistant molding composition based on linear saturated polyesters wherein the polyester mass contains an alkali metal salt of a dialkyl-phosphinyl-alkanesulfonic acid of

the formula



where $R_1$ and $R_2$ each are alkyl groups having from 1 to 4 carbon atoms, *n* represents integers of from 1 to 12 and Me is an alkali metal atom.

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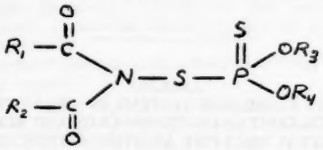
**3,865,781**

## N-(DIHYDROCARBYLPHOSPHORODITHIO)IMIDES AS PREMATURE VULCANIZATION INHIBITORS

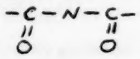
**Delmar F. Lohr, Jr., and Edward L. Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Aug. 31, 1973, Ser. No. 393,517**
**Int. Cl. C08d** *11/04*
**U.S. Cl. 260—45.8 N** **8 Claims**

1. A method of inhibiting premature vulcanization in rubber compounds comprising applying to rubber compounds selected from the class consisting of polybutadiene, polystryenebutadiene, polyisoprene, nitrile rubbers, and polychloroprene an inhibitor



wherein $R_1$ and $R_2$ are aliphatic, cyclic or aromatic hydrocarbon groups or mixtures thereof containing from 1 to about 16 carbon atoms, said $R_1$ and $R_2$ are interconnected and taken together with said



group to form an imide group,

and wherein $R_3$ and $R_4$ are aliphatic, cyclic, or aromatic hydrocarbon groups or mixtures thereof containing from 1 to about 16 carbon atoms, and

said inhibitor ranging from about 0.05% to about 5.0% by weight of said rubber compound.

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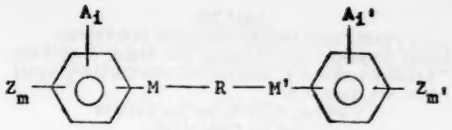
**3,865,782**

## POLYACRYLATE PLASTIC COMPOSITIONS CONTAINING FLAME RETARDANTS

**Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, St. Louis, Mich.**

**Continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Feb. 8, 1973, Ser. No. 330,774. The portion of the term of this patent subsequent to July 16, 1991, has been disclaimed.**
**Int. Cl. C08f** *45/60*
**U.S. Cl. 260—45.9 R** **29 Claims**

1. A plastic composition containing polyacrylate having incorporated therein a flame retardant which is a halogenated aryl compound having the formula:

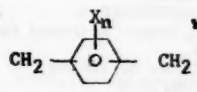


wherein i'is selected from the group consisting of bromine or chlorine; *m* and *m'* are integers having a value of 1–5; *i* and ' are integers having a value of 0–2; M and M' are each independent and are selected from the group consisting of oxygen, nitrogen or sulfur with the proviso that M and M' cannot concurrently be oxygen in both cases and where M and/or M' is nitrogen, the formula is

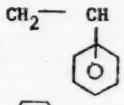
; A is selected from the group consisting of chlorine, cyano, nitro, lower alkoxy, lower alkyl, fluorine, dialkylamino, phenyl, halo-phenyl, benzyl, or halo- benzyl; and R is selected from the group consisting of

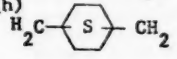
a. alkylene group having from one to six carbon atoms
b. $CH_2—CH(OH)—CH_2$
c. $CH_2—CH(CH_2OH)—CH_2$
d. $(CH_2)_w—O—(CH_2)_w$

where $w = 1–6$

(e)  where X = H, Cl, Br, n = 4

f. $CH_2—C(O)—CH_2$

(g) 

(h)  where S = saturated ring

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**3,865,783**

## FLAME-RETARDANT POLYESTER

**Raymond J. Clutter, Asheville, N.C., assignor to Akzona Incorporated, Asheville, N.C.**

**Continuation-in-part of Ser. No. 254,557, May 18, 1972, abandoned. This application Dec. 7, 1972, Ser. No. 313,051**
**Int. Cl. C09k** *3/28*
**U.S. Cl. 260—45.9 NP** **8 Claims**

1. Flame retarded linear polyester containing from about 1 to about 20 weight percent of a thermally and chemically stable cyclophosphazene derivative selected from the group consisting of cyclotri- and cyclotetraphosphazene, having, respectively, 6 or 8 substituents thereon selected from the group consisting of phenyl and phenoxy as flame retardant, said cyclophosphazene thermal and chemical stability being maintained at temperatures up to about 300° C.

3,865,784

## STABILIZED ORGANOSILICON POLYMERS

Robert Schwenn Neale, Ossining, and Arthur Noah Pines, Katonah, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 5, 1973, Ser. No. 422,090
Int. Cl. C08g *51/56*
U.S. Cl. 260—45.75 R 28 Claims

1. A process for preparing a stabilized iron-containing diorganopolysiloxane compound which comprises heating a mixture consisting essentially of (1) a diorganopolysiloxane fluid consisting essentially of siloxy units selected from the group consisting of dimethylsiloxy, diphenylsiloxy, methylphenylsiloxy, methylhydroxysiloxy, methylvinylsiloxy, trimethylsiloxy and dimethylhydroxysiloxy units and (2) an iron carbonyl compound in an amount sufficient to provide from 20 parts by weight of iron to 10,000 parts by weight of iron in the stabilized iron-containing diorganopolysiloxane product based on a million parts of weight of said diorganopolysiloxane fluid and wherein said carbonyl is selected from the group consisting of $Fe(CO)_5$, $Fe_2(CO)_9$, $Fe_3(CO)_{12}$ and mixtures thereof, at a temperature of 120°C. to 350° C. in the presence of oxygen.

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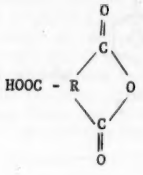
3,865,785

## POLYESTERAMIDEIMIDES

Denis R. Pauze, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1972, Ser. No. 318,990
Int. Cl. C08g *20/30*
U.S. Cl. 260—75 N 3 Claims

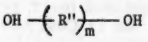
1. The reaction product of (1) the reaction product of tricarboxylic acid material having the formula



where R is a trivalent radical; material selected from aliphatic dicarboxylic acid and dicarboxylic acid anhydride and polyamine having the formula

$$X—R'—(NH_2)_n$$

where R′ is a diorgano radical and n is at least 2 and (2) glycol having the formula



where *m* ranges from about 2 to 12 and R″ is alkylene wherein the ratio of tricarboxylic acid material to material selected from aliphatic dicarboxylic acid and dicarboxylic acid anhydride ranges from about 1:3 to 9:1, the ratio of equivalents of tricarboxylic acid material to polyamine ranges from about 1:4 to 9:10, and the equivalent ratio of polyamine to glycol ranges from about 99:1 to 4:1.

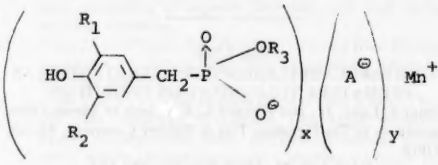
3,865,786

## MANGANOUS ORGANO PHOSPHONATE UV LIGHT ABSORBERS FOR POLYAMIDES

Helmut Mueller, Binningen; Paul Mosher, Basel, and Helmut Linhart, Reinach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 188,996, Oct. 13, 1971, abandoned. This application Dec. 7, 1972, Ser. No. 312,998
Claims priority, application Switzerland, Oct. 20, 1970, 15422/70
Int. Cl. C08g *51/62*
U.S. Cl. 260—45.75 R 6 Claims

1. A synthetic polyamide composition stabilized against light deterioration with 1.0 to 500 parts per million of manganese relative to the polyamide, said manganese being in the form of a compound having the formula



in which $R_1$ and $R_2$ independently of one another is alkyl with 1 to 8 carbon atoms, and $R_1$ and $R_2$ together contain not more than 12 carbon atoms, A is the anion of an aliphatic carboxylic acid with 1 to 18 carbon atoms or of an aromatic carboxylic acid with 7 to 11 carbon atoms or is the chloride, bromide or iodide anion, *x* is 1 or 2, *y* is 0 or 1, with $x + y$ being 2, and $R_3$ is alkyl with 1 to 18 carbon atoms.

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3,865,787

## RESIN STABILIZER SYSTEMS OF ORGANOTIN SULFUR-CONTAINING COMPOUNDS AND ALKALI METAL BISULFITE ADDITION PRODUCTS

Jerome H. Ludwig, Shaker Heights, and Dale J. Dieckmann, Euclid, both of Ohio, assignors to Dart Industries Inc., Los Angeles, Calif.

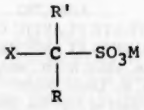
Filed Apr. 23, 1973, Ser. No. 353,911
Int. Cl. C08f *51/62*
U.S. Cl. 260—45.75 S 16 Claims

1. A resin stabilizer composition which consists essentially of,

an organotin sulfur-containing compound having a

group, and

an alkali metal bisulfite addition product characterized by the formula



where M is an alkali metal and R or R′ is selected from the class consisting of hydrogen, hydrocarbyl and substituted hydrocarbyl and X is selected from the class consisting of hydrogen and hydroxyl,

said organotin and addition product components in relative amounts which together provide a synergistic stabilizing effectiveness upon said resin.

3,865,788

## ORGANOPOLYSILOXANE ELASTOMERS EXHIBITING HIGH ELONGATION

Norman G. Gaylord, New Providence, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 20, 1973, Ser. No. 389,849
Int. Cl. C08f 11/04
U.S. Cl. 260—46.5 G 5 Claims

1. A process for preparing heat curable silicone elastomer compositions which after complete curing exhibit excellent toughness and high elongation comprising admixing with an organopolysiloxane gum the organic portion of which is essentially hydrocarbon and 0.05 to 3 percent by weight of the organosiloxane units of which contain olefinic unsaturation from about 0.1 part to about 4 parts by weight of t-butyl-$\beta$-hydroxy ethyl peroxide per 100 parts by weight of said organopolysiloxane gum.

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3,865,789

## DIELECTRIC POLYESTER RESINS FROM A BLEND OF ETHOXYLATED BIS PHENOLS

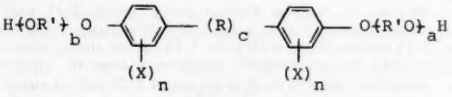
John R. Wyhof, Newark, Del., assignor to ICI America Inc., Wilmington, Del.

Filed May 21, 1973, Ser. No. 362,540
Int. Cl. C08g 17/10
U.S. Cl. 260—47 C 14 Claims

1. A dielectric resin comprising the reaction product of

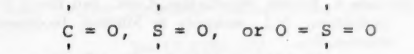
a. a dicarboxylic acid or an anhydride thereof, provided that at least 80 mol percent of said acid or anhydride is an alpha unsaturated dicarboxylic acid, an anhydride thereof, an aromatic dicarboxylic acid or an anhydride thereof, and

b. a polyol blend comprising a first polyol having the following formula:



wherein

R is an alkylidene group containing from one to four carbon atoms, a cycloalkylidene group containing five or six carbon atoms, oxygen, sulfur, or a radical having one of the following formulas:



*c* is 0 or 1;

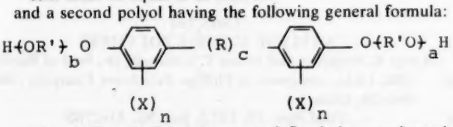
X is halogen or an alkyl radical containing from one to three carbon atoms;

*n* is an integer equal to from 0 to 4;

R′ is an alkylene group containing from two to four carbon atoms or the radical $CH_2CH\theta$; and

*a* and *b* are integers each of which is equal to at least 1 and the sum of which is equal to about 2, provided that the sum must be equal to at least 2.0

and a second polyol having the following general formula:



wherein R, *c*, X, R′, and *n* are as defined above and *a* and *b* are integers each of which is equal to at least 1 and the sum of which is equal to from about 4 to about 16,

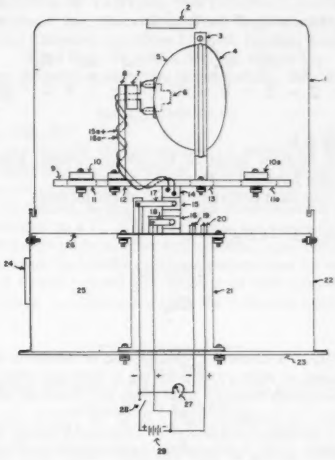
wherein the amount of acid or anhydride employed is sufficient to introduce from about 0.8 to about 1.2 carboxyl groups per hydroxyl group in the polyol blend.

3,865,790

## PERSISTENCE OF VISION, SUBLIMINAL SPOT LIGHT

Harold P. Du Shane, 1774 Greenwood Ave., Trenton, N.J. 08609

Filed Nov. 24, 1972, Ser. No. 309,600
Int. Cl. F21m 7/00, 13/00
U.S. Cl. 240—49 5 Claims



1. A self-contained spot light assembly comprising:

a. a housing having a transparent top section;

b. an electric lamp having a filament mounted within the transparent top section of said housing;

c. reflector means rotatably mounted about an axis centered through the filament in said lamp within the transparent top section of said housing for concentrating a beam of light emitted by said lamp into a strong narrow beam and projecting the beam through the transparent top section of said housing;

d. means mounted within said housing and secured to said reflector means for continuously rotating said reflector means at speeds of at least about 600 rpm to project a concentrated beam of light a full 360° through the transparent top section of said housing;

e. means within the transparent top section for adjusting said reflector means with respect to said rotating means for rotation about the axis centered through said lamp filament;

f. means within the transparent top section for adjusting the balance of said rotatably mounted reflector means with respect to said rotating means about the axis of rotation;

g. electric power source means within said housing for said lamp and said reflector rotating means; and

h. means mounted in said housing for varying the speed of rotation of said reflector rotating means.

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3,865,791

## CERTAIN ENAMINE COMPOUNDS AND METHODS FOR MAKING AND USING THE SAME

Bernd Brinkmann, Werne, Muensterfort, and Eugen Griebsch, Steinstrasse 22, Unna, both of Germany

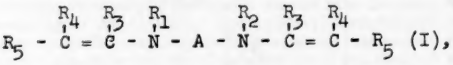
Filed Apr. 3, 1972, Ser. No. 240,762
Claims priority, application Germany, Apr. 6, 1971, 2116882
Int. Cl. C08g 22/00, 22/08
U.S. Cl. 260—77.5 CH 4 Claims

1. A stable mixture which forms a polyurea polymer in the presence of water, said mixture comprising

A. at least one polyisocyanate; and

B. a moisture-sensitive compound hydrolyzing in the presence of water to form an amine reactable with said polyisocyanate, said compound being

1. a compound containing at least one enamine group and at least one ketimine or aldimine group;
2. a prepolymeric reaction product of a polyisocyanate and an enamine having at least one hydroxy ar amino group; or
3. a dienamine of the formula



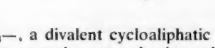
wherein A is

aa. a divalent linear or branched aliphatic hydrocarbon group having 4 – 36 carbon atoms;

ab. a divalent polyether chain of the formula

$$-B-O-_nB-,$$

wherein B is $-CH_2CH_2-$,



$-(CH_2)_4-$, a divalent cycloaliphatic or aromatic hydrocarbon group, or such a group having at least one alkyl substituent, said group having a total of up to 12 carbon atoms, and wherein n is an integer from 1 to about 1000;

ac. a divalent cyclopentyl or cyclohexyl group, or such a group having at least one alkyl substituent, said group having a total of up to 12 carbon atoms; or

ad. a divalent aromatic hydrocarbon group, or such a group having at least one alkyl substituent, said group having a total of up to 12 carbon atoms;

ae. a divalent group as defined in (aa) – (ad) wherein one or more hydrogen atoms is replaced by hydroxy; and wherein $R_1$ and $R_2$, taken alone, are each

ba. a univalent linear or branched aliphatic group, or an unsubstituted or alkyl substituted cycloaliphatic or aromatic group, said group having 1 to 12 carbon atoms; or bb. a divalent ethylene group forming a closed heterocyclic ring with group A;

bc. a cyanoethyl group; and wherein $R_1$ and $R_2$, taken together, are

bd. a divalent ethylene group or such a group substituted with an hydroxy group or at least one alkyl group, in which case A is an ethylene group or such a group substituted with at least one alkyl group;

and wherein

ca. $R_3$ is hydrogen and $R_4$ and $R_5$, which may be the same or different, are hydrogen, methyl, or ethyl; or

cb. $R_5$ is hydrogen and $R_3$ and $R_4$ together are a divalent trimethylene or tetramethylene group, or such a group having at least one alkyl substituent, said group having a total of up to eight carbon atoms.

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**3,865,792**

## COPOLYMERS AND TERPOLYMERS AND POLYAMIDE-POLYESTERS

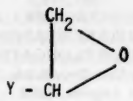
**Sung Ki Lee, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Division of Ser. No. 90,817, Nov. 18, 1970, abandoned. This application Dec. 27, 1972, Ser. No. 319,077**

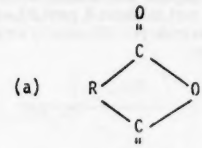
**Int. Cl. C08g** *20/00*

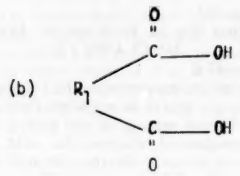
**U.S. Cl. 260—78 R** **6 Claims**

**1.** A polyester polyamide produced in a process, wherein the reaction medium is a non-polar solvent, by reacting (1) an aziridine monomer, (2) an organic oxide of the formula:



where Y is hydrogen or a monovalent, saturated or unsaturated, alkylene, aromatic, bicyclic or heterocyclic group of 1 to 18 carbon atoms, and (3) an organic (a) anhydride, or (b) dicarboxylic acid of the formula:





wherein R is a saturated or unsaturated, aromatic, aliphatic, alicyclic, or bicyclic divalent group having 2–18 carbon atoms; if aromatic or alicyclic, 6–18 carbon atoms; if aliphatic, 2–18 carbon atoms; if bicyclic, 7–18 carbon atoms; where $R_1$ is alpha, beta-ethylenically unsaturated aromatic, aliphatic, alicyclic or bicyclic divalent groups of 2–20 carbon atoms; if aromatic or alicyclic, 6–18 carbon atoms; if aliphatic, 2–18 carbon atoms; and if bicyclic, 12–18 carbon atoms.

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**3,865,793**

## POLYHYDROXY COMPOSITIONS

**Herman A. Bruson, Woodbridge, Conn., and Henry Gould, Englishtown, N.J., assignors to Milchem Incorporated, Houston, Tex.**

**Filed Mar. 9, 1973, Ser. No. 339,604**

**Int. Cl. C08f** *15/36, 27/04*

**U.S. Cl. 260—78.5 R** **5 Claims**

**1.** A 1-to-1 mole ratio hydrolyzed copolymer of (a) a member selected from the class consisting of mono-allyl maleate and mono-allyl fumarate and (b) a member selected from the class consisting of maleic anhydride, fumaric acid and maleic acid.

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**3,865,794**

## ARYLENE SULFIDE POLYMERS

**Lacey E. Scoggins, and James T. Edmonds, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 19, 1973, Ser. No. 416,780**

**Int. Cl. C08g** *23/00*

**U.S. Cl. 260—79.1** **14 Claims**

**1.** A method of producing a polymer which comprises:

a. forming a composition by contacting at least one polyhalo-substituted aromatic compound, wherein the halogen atoms are attached to aromatic ring carbon atoms, at

least one thiosulfate selected from the group consisting of lithium thiosulfate, sodium thiosulfate, potassium thiosulfate, rubidium thiosulfate, cesium thiosulfate, magnesium thiosulfate, calcium thiosulfate, strontium thiosulfate and barium thiosulfate, at least one base selected from the hydroxides of lithium, sodium, potassium, rubidium, cesium, magnesium, calcium, strontium, and barium and the carbonates of sodium, potassium, rubidium and cesium and at least one organic amide; and,

b. maintaining at least a portion of said composition at polymerization conditions to produce said polymer.

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**3,865,795**

**ARYLENE SULFIDE POLYMERS**

**Charles W. Moberly, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 19, 1973, Ser. No. 416,824**

**Int. Cl. C08g** *23/00*

**U.S. Cl. 260—79.1** **14 Claims**

**1.** A method of producing a polymer which comprises:

a. forming a composition by contacting at least one polyhalo-substituted aromatic compound wherein the halogen atoms are attached to aromatic ring carbon atoms, at least one base selected from the hydroxides of lithium, sodium, potassium, rubidium, cesium, magnesium, calcium, strontium and barium and the carbonates of sodium, potassium, rubidium, and cesium, at least one organic amide and at least one trithiocarbonate having the formula

wherein each R is an alkali metal or a monovalent hydrocarbyl radical selected from alkyl, cycloalkyl, and aryl and combinations of said radicals, the number of carbon atoms in said hydrocarbyl radical being within the range of 1 to about 12; and,

b. maintaining at least a portion of said composition at polymerization conditions to produce said polymer.

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**3,865,796**

**PHOSPHORUS-CONTAINING POLYMERS**

**Erwin Schmidt, Kelkheim/Taunus, and Claus Beermann, Neu-Isenburg, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt (Main), Germany**

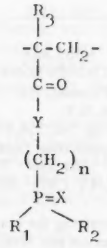
**Continuation-in-part of Ser. No. 192,561, Oct. 26, 1971, abandoned. This application Nov. 7, 1973, Ser. No. 413,496**

**Claims priority, application Germany, Oct. 27, 1970, 2052568**

**Int. Cl. C08f** *3/84*

**U.S. Cl. 260—80 PS** **9 Claims**

**1.** A phosphorus-containing solid polymer comprising recurring units of the formula



in which $R_1$ and $R_2$ are alkyl groups having from 1 to 3 carbon atoms, $R_3$ is a hydrogen atom or the methyl group, X is oxygen or sulfur, Y is oxygen or a group of the formula —NR—, in which R is a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms and n is 1 to 3.

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**3,865,797**

**PROCESS FOR THE PRODUCTION OF PETROLEUM RESINS OF VARYING SOFTENING POINTS**

**David Richard Joy, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Sept. 24, 1973, Ser. No. 400,301**

**Claims priority, application Great Britain, Oct. 2, 1972, 45333/72**

**Int. Cl. C08f** *15/42*

**U.S. Cl. 260—82** **8 Claims**

**1.** A process for the production of petroleum resins of varying softening points in which the residue remaining after the removal of butadiene from a $C_4$ fraction and which consists of iso-butene, butene-1, cis- and trans-butene-2 and butanes is added to a $C_5$ stream boiling in the range 10° to 80° C which is derived from a thermally or steam cracked naphtha or gas oil and the resulting mixture polymerized by means of a Friedel Crafts catalyst, the amount of said residue added being chosen to achieve lowering the softening point in the resin.

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**3,865,798**

**PHOTOACTIVE POLYMERS; INDUCED EXOCYCLIC QUARTET CONCEPT**

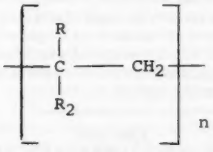
**Richard W. Radler, Jr., Penfield; Richard P. Millonzi, Marion, and John A. Bergfjord, Macedon, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 346,393, March 30, 1973, , which is a continuation-in-part of Ser. No. 192,898, Oct. 27, 1971, abandoned. This application Dec. 12, 1973, Ser. No. 424,137**

**Int. Cl. C08f** *7/02, 7/12*

**U.S. Cl. 260—88.3 R** **4 Claims**

**1.** A process for obtaining transparent organic polymeric matrix material having requisite electrical and physical properties for rapid xerographic recycling the repeat unit of said matrix material comprising electronically active organic monomeric units represented by the formula

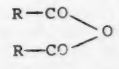


wherein R is defined as an alkyl group of 1–15 carbon atoms or an aryl group;

$R_2$ is an aryl group of at least two fused rings, a nitrogen-containing heterocyclic, an oxygen-containing heterocyclic or a sulfurcontaining heterocyclic; and

*n* is a positive number ranging from about 5–5,000; comprising

contacting a polycyclic compound corresponding to the $R_2$ group with at least an equimolar amount of an acid anhydride of the formula



in the presence of zinc chloride and a reaction solvent to obtain the corresponding acyl derivative;

converting the acyl derivative to the vinyl intermediate;
contacting with triphenylmethylphosphonium bromide and an organo metallic base; and thereafter
polymerizing the resulting intermediate in an amount of not less than about 60 percent by weight of the monomeric reactants in the presence of a catalytic amount of a Lewis Acid at a temperature of about −75°C to 0°C to obtain the desired product.

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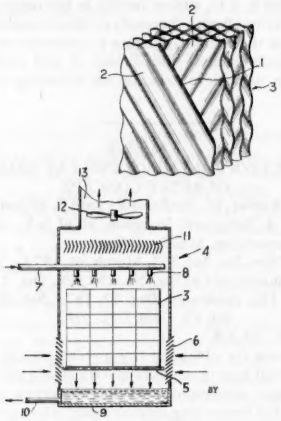
**3,865,799**

## SINTERED PLATE OF POLYVINYL CHLORIDE RESIN AND METHOD OF MAKING THE SAME

**Kotaro Katagiri, Tokyo, and Yoshio Nakamura, Saitama-ken; both of Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan**

**Continuation of Ser. No. 63,148, Aug. 12, 1970, abandoned. This application Aug. 21, 1972, Ser. No. 282,353**
**Claims priority, application Japan, Aug. 26, 1969, 44-67483**
**Int. Cl. C08f** *1/88, 3/30*
**U.S. Cl. 260—92.8 A** **3 Claims**




**1.** A sintered porous plate for use as packing in a cooling tower, said plate being formed of polyvinyl chloride homopolymer resin having a tensile strength of at least 0.7 kg/mm², and containing a mixture of 100 parts by weight of polyvinyl chloride resin, at least 90% by weight of which has a particle size of from 10 to 150$\mu$, and from 0.1 to 10 parts by weight of one or more surface active agents.

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**3,865,800**

## MANUFACTURE OF POLYMERS OF CYCLOOLEFINS BY RING-OPENING POLYMERIZATION OF CYCLOOLEFINS

**Hans-Martin Weitz, 17 Wildstrasse, 6710 Frankenthal, and Helmut Schwarz, 17 Grasse Casse, 6700 Ludwigshafen, both of Germany**

**Filed Jan. 4, 1973, Ser. No. 320,846**
**Int. Cl. C08f** *5/00*
**U.S. Cl. 260—93.1** **3 Claims**

**1.** In a process for the manufacture of polymers of cyclopentene by ring-opening polymerization of cyclopentene using a catalyst system, wherein the catalyst system used is one consisting of

1. the transition metal salt $WCl_6$,
2. the organometallic compound $Pb(C_2H_5)_4$ and
3. a suspension of $AlCl_3$, and wherein per mole of catalyst component (1), there are present from 0.1 to 100 moles of catalyst component (2) and from 0.1 to 250 moles of catalyst component (3), the improvement which comprises: mixing a suspension of $AlCl_3$ with $Pb(C_2H_5)_4$ and thereafter adding $WCl_6$ followed by the addition of cyclopentene.

**3,865,801**

## STABILIZATION OF URINARY ERYTHROPOIETIN USING SODIUM P-AMINOSALICYLATE AND EXTRACTING INTO PHENOL

**Shyozo Chiba, Tokyo, Japan; Charles K. H. Kung, Country Club Hills, and Eugene Goldwasser, Chicago, both of Ill., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed June 15, 1973, Ser. No. 370,520**
**Int. Cl. C07g** *15/00*
**U.S. Cl. 260—112 R** **5 Claims**

**1.** A method of separating erythropoietin activity from portease activity and sialidase activity comprising:

a. preparing a feed solution of crude urinary erythropoietin in phosphate-buffered-saline;
b. adding sodium p-aminosalicylate to the feed solution;
c. extracting the erythropoietion into phenol;
d. dialyzing the separated phenol fraction against a phosphate-buffered-saline solution; and
e. recovering erythropoietin from the dialyzed fraction, whereby the erythropoietic activity is separated from the protease activity and the sialidase activity and the biological activity of erythropoietin is stabilized.

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**3,865,802**

## PROCESS FOR OBTAINING FULL-FAT OILSEED-PROTEIN BEVERAGES USING WATER AND INITIAL ACID PH

**Gus C. Mustakas, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 278,845, Aug. 8, 1972, Pat. No. 3,809,771. This application June 20, 1973, Ser. No. 371,643**
**Int. Cl. A23j** *1/14*
**U.S. Cl. 260—123.5** **2 Claims**

**1.** A method of producing full-fat oilseed-protein beverages comprising the following steps:

a. suspending full-fat oilseed flour in from 8 to 10 times its own weight of water, which has been adjusted to a temperature of from about 150° to 212° F. and a pH of from about 3.5 to about 4.5, for a time sufficient to inactivate lipoxygenase enzyme present in the full-fat oilseed flour;
b. cooling the suspension to and holding at a temperature of from about 50° to 75° F. for a time sufficient to precipitate lipid-protein present in the full-fat oilseed flour;
c. separating the precipitated lipid-protein from the resulting liquid whey;
d. resuspending the precipitated lipid-protein in water at a pH of about 9, the amount of said water equaling from about 7 to 10 times the weight of the oilseed flour of step (a);
e. heating the suspension of step (d) at from about 205° to 212° F. for from about 1 to 5 minutes;
f. cooling the suspension of step (e) to about 70° to 75° F. and adjusting the pH to about 7;
g. extracting the fat contained in the neutralized suspension of step (f) with a suitable solvent; and
h. removing the water from the defatted suspension of step (g).

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**3,865,803**

## MODIFIED LIGNIN SURFACTANTS

**Sten I. Falkehag, Mt. Pleasant, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 256,779, May 25, 1972, Pat. No. 3,763,139. This application Sept. 27, 1973, Ser. No. 401,530**
**Int. Cl. C07g** *1/00*
**U.S. Cl. 260—124 A** **5 Claims**

**1.** Lignin adducts comprising the reaction product of lignin and from about 1 to 20 moles per 1000 grams of said lignin of an agent of the formula

$X(CH_2)_nY$

wherein X is a halogen, a halohydrin group, an activated double bond or an epoxide group, Y is a sulfonate, phosphonate, hydroxyl, sulfide or an amine of the types N $R_1$ $R_2$ or N $R_1$ $R_2$ $R_3$ wherein R is hydrogen or an alkyl group having up to 18 carbon atoms, and *n* is an integer from 1 to 5, to give lignin adducts having blocked acidic hydroxyl groups.

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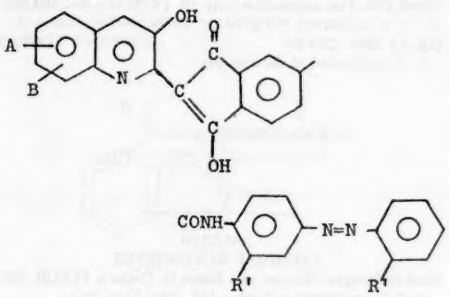
**3,865,804**
**YELLOW 3'-HYDROXYQUINOPHTHALONE-5-(P-PHENYLAZO)CARBOXANILIDE DYE**

**John Blackwell, Kenneth Sq., Pa., and Richard A. Fendglis, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 94,524, Dec. 2, 1970, Pat. No. 3,770,746.**
**This application Apr. 16, 1973, Ser. No. 351,625**
**Int. Cl. C07d** *33/46;* **C09b** *43/12*
**U.S. Cl. 260—155** **1 Claim**

1. Yellow water insoluble quinophthaloneazo dye having the formula



wherein A and B are the same or different and are selected from H, $C_{1-4}$ alkyl (but not adjacent t-butyl), Cl and Br or A and B are adjacent and together are —C=C—C=C— and R' is H or $C_{1-4}$ alkyl.

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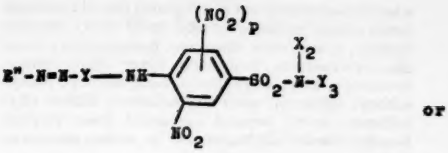
**3,865,805**
**AZO COMPOUNDS HAVING A 2-NITRO-4-PHENYLSULFAMOYLDIPHENYL AMINE NUCLEUS**

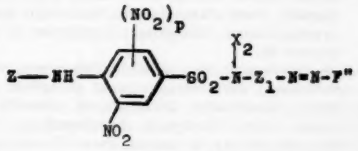
**Ruedi Altermatt, Hauptstrasse 65, Tecknau, Basel-Land, Switzerland**

**Continuation of Ser. No. 851,444, Aug. 19, 1969, abandoned.**
**This application Dec. 2, 1971, Ser. No. 204,382**
**Claims priority, application Switzerland, Aug. 30, 1968, 13051/68; Dec. 19, 1968, 18944//68; Dec. 19, 1968, 18943/68**
**Int. Cl. C09b** *43/00, 43/12*
**U.S. Cl. 260—205** **15 Claims**

1. A compound of the formula



or



wherein

E'' is phenyl, substituted phenyl having 1 or 2 substituents, naphthyl or methylsulfonylnaphthyl,

wherein each substituent of substituted phenyl is independently chloro, bromo, lower alkyl, lower alkoxy, trifluoromethyl, nitro, cyano, thiocyano, phenoxy, formyl, acetyl, benzoyl, lower alkylsulfonyl, lower hydroxyalkylsulfonyl, benzylsulfonyl, sulfamoyl, lower alkylsulfamoyl, cyanoethylsulfamoyl, hydroxyethylsulfamoyl, dilower alkylsulfamoyl, N,N-di(cyanoethyl)sulfamoyl, N,N,-di(hydroxyethyl)sulfamoyl, phenylsulfamoyl, formamido, lower alkanoylamino, chloropropionamido, benzamido, lower alkylsulfonylamino, lower alkoxycarbonyl, benzyloxycarbonyl, lower alkoxycarbonylamino, carbamoyl, lower alkylcarbamoyl, dilower alkylcarbamoyl or phenylcarbamoyl,

F'' is phenyl, substituted phenyl having 1 or 2 substituents, naphthyl or methylsulfonylnaphthyl, wherein each substituent of substituted phenyl is independently chloro, bromo, lower alkyl, lower alkoxy, phenoxy, trifluoromethyl, thiocyano, cyano, nitro, hydroxy, formyl, acetyl, benzoyl, lower alkylsulfonyl, hydroxyethylsulfonyl, benzylsulfonyl, sulfamoyl, lower alkylsulfamoyl, cyanoethylsulfamoyl, hydroxyethylsulfamoyl, dilower alkylsulfamoyl, N,N-di(cyanoethyl)-sulfamoyl, N,N-di(hydroxyethyl)sulfamoyl, phenylsulfamoyl, lower alkylamino, cyanoethylamino, dilower alkylamino, N,N-di(cyanoethyl)amino, N-ethyl-N-cyanoethylamino, N,N-di(hydroxyethyl)-amino, formamido, lower alkanoylamino, chloropropionamido, benzamido, methylsulfonylamino, lower alkoxycarbonyl, benzyloxycarbonyl, lower alkoxycarbonylamino, carbamoyl, lower alkylcarbamoyl, dilower alkylcarbamoyl or phenylcarbamoyl,

$X_2$ is hydrogen, lower alkyl or monosubstituted lower alkyl, wherein the substituent of monosubstituted lower alkyl is chloro, bromo, hydroxy, cyano, lower alkanoyloxy, benzoyloxy, lower alkoxycarbonyloxy, lower alkoxycarbonyl, carbamoyl, benzyloxycarbonyloxy, lower alkoxy, phenoxy, phenyl, methylcarbamoyloxy or phenylcarbamoyloxy,

Y is phenylene or substituted phenylene having 1 or 2 substituents, wherein each substituent of substituted phenylene is independently chloro, bromo, lower alkyl, lower alkoxy, formamido, lower alkanoylamino, benzamido, lower alkoxycarbonylamino, benzyloxycarbonylamino or chloropropionamido,

$Y_3$ is phenyl or substituted phenyl having 1 or 2 substituents,

wherein each substituent of substituted phenyl is independently chloro, bromo, lower alkyl, lower alkoxy, phenoxy, hydroxy, cyano, nitro, thiocyano, hydroxyethoxy, lower alkanoyloxyethoxy, formamido, lower alkanoylamino, benzamido, lower alkylsulfonyl, benzylsulfonyl, phenylsulfonyl, sulfamoyl, lower alkylsulfamoyl, dilower alkylsulfamoyl, acetyl, benzoyl, carbamoyl, lower alkylcarbamoyl, dilower alkylcarbamoyl or methoxypropylcarbamoyl,

Z is phenyl or substituted phenyl having 1 or 2 substituents, wherein each substituent of substituted phenyl is independently chloro, bromo, lower alkyl, lower alkoxy, formamido, lower alkanoylamino, benzamido, lower alkoxycarbonylamino, benzyloxycarbonylamino or chloropropionamido,

$Z_1$ is phenylene or monosubstituted phenylene, wherein the substituent of mono-substituted phenylene is chloro, bromo, lower alkyl, lower alkoxy, phenoxy, hydroxy, cyano, nitro, thiocyano, hydroxyethoxy, lower alkanoyloxyethoxy, formamido, lower alkanoylamino, benzamido, lower alkylsulfonyl, benzylsulfonyl, phenylsulfonyl, sulfamoyl, lower alkylsulfamoyl, acetyl, benzoyl, carbamoyl, lower alkylcarbamoyl or methoxypropylcarbamoyl, and

p is 0 or 1.

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**3,865,806**

## LOW VISCOSITY, LOW EQUIVALENT WEIGHT POLYETHER POLYOLS AND A METHOD FOR THEIR PREPARATION

**Louis Robert Knodel, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 102,234, Dec. 28, 1970, abandoned. This application Jan. 28, 1972, Ser. No. 221,783**

**Int. Cl. C07c** *47/18*

**U.S. Cl. 260—209 R** **13 Claims**

1. A low viscosity polyether polyol having a hydroxyl functionality in the range of from about 4 to about 8, an active hydrogen equivalent weight of from about 80 to about 220 which is the reaction product of

A. A hydroxyl-containing initiator compound having from about 4 to about 8 hydroxyl groups per molecule or a mixture of an initiator compound having 3 hydroxyl groups per molecule and a solid initiator compound having from about 4 to about 8 hydroxyl groups with

B. A mixture of alkylene oxides comprising from about 1 to about 50 percent by weight of ethylene oxide and from about 50 to about 99 percent by weight of a vicinal alkylene oxide having from about 3 to about 4 carbon atoms.

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**3,865,807**

## AROMATIC DEXTRAN DERIVATIVES

**Saran A. Narang, and Joseph J. Michniewicz, both of Ottawa, Ontario, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Ontario, Canada**

**Filed Dec. 3, 1971, Ser. No. 204,764**

**Int. Cl. C08b** *19/08*

**U.S. Cl. 260—209 D** **11 Claims**

1. Dextran molecules which are cross-linked through glyceryl diether groups, and have attached (a) groups containing hydrocarbon aromatic rings selected from the class consisting of benzyl, diphenylmethyl, triphenylmethyl, benzoyl, naphthoyl and anisoyl and (b) cationic groups selected from the class consisting of triethylaminoethyl, diethylaminoethyl and diethyl-2-hydroxypropyl-ammonium cationic groups, groups (a) and cationic groups (b) being attached to the dextran molecules by ether linkages.

**3,865,808**

## RECOVERY OF NITROCELLULOSE FROM THE FILTRATE OBTAINED AFTER THE NITRATION OF CELLULOSE

**Francois Ange Pollozec, Bergerac, France, assignor to Societe Nationale des Poudres et Explosifs, Paris, France**

**Filed July 9, 1973, Ser. No. 377,737**

**Claims priority, application France, July 18, 1972, 72.25862**

**Int. Cl. C08b** *5/00, 21/02*

**U.S. Cl. 260—223** **5 Claims**

1. A process for the recovery of nitrocellulose from the filtrate obtained by filtering nitrocellulose from an aqueous reaction medium in which it has been formed by the nitration of cellulose, said filtrate containing from 0.5 to 4 g/litre of nitrocellulose, which process comprises the steps of:

i. flocculating nitrocellulose in said filtrate by treating the latter with a cationic polyacrylamide as flocculant, and

ii. filtering said flocculated nitrocellulose from the treated filtrate on a filter having a filter layer which is pre-coated with flocculated nitrocellulose of thickness sufficient to allow a flow of about 3 m/h.

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**3,865,809**

## O-(N-METHYLTHIOCARBAMOYL)-HEXAMETHYLENIMINE-2-OXIME

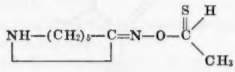
**Marvin Theodore Tetenbaum, Convent, N.J., assignor to Allied Chemical Corporation, New York, N.Y.**

**Division of Ser. No. 207,959, Dec. 14, 1971, Pat. No. 3,780,178. This application July 30, 1973, Ser. No. 383,864**

**Int. Cl. C07d** *27/04, 29/34, 41/04*

**U.S. Cl. 260—239 BF** **1 Claim**

1. A compound of the formula



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**3,865,810**

## AZIRIDINE DERIVATIVES

**Haakon Haugen, Beacon, and James G. Dadura, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Division of Ser. No. 143,185, May 13, 1971, Pat. No. 3,753,907. This application Sept. 14, 1972, Ser. No. 289,219**

**Int. Cl. C07d** *23/06*

**U.S. Cl. 260—239 E** **12 Claims**

1. A method of preparing an aziridine derivative comprising:

a. first contacting a polyalkene of an average molecular weight between about 500 and 5,000 derived from an alkene of from 2 to 5 carbons with $P_2S_5$ in the presence of between about 0.1 and 5 wt. percent sulfur at a temperature between about 100° and 320°C., $P_2S_5$ comprising between about 5 and 40 wt. percent of the reaction mixture to form a polyalkene-$P_2S_5$ first reaction product,

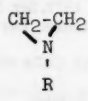
b. second contacting the said polyalkene-$P_2S_5$ first reaction product with steam at a temperature between about 100° and 260°C., utilizing at least about a mole ratio excess of steam in respect to said polyalkene-$P_2S_5$ first reaction product to form a steam hydrolyzed polyalkene-$P_2S_5$ second reaction product,

c. third removing inorganic phosphorus acid from the steam hydrolyzed polyalkene-$P_2S_5$ second reaction product to form an inorganic phosphorus acid free, steam hydrolyzed polyalkene-$P_2S_5$ third product,

d. fourth contacting said inorganic phosphorus acid free, steam hydrolyzed polyalkene-$P_2S_5$ third product with ethylene oxide in a mole ratio of reaction product to ethylene oxide of between about 1 and 4 at a temperature between about 60 and 150°C. under a pressure of be-

tween about 10 and 500 psig to form monoethoxylated inorganic phosphorus free, steam hydrolyzed polyalkene-$P_2S_5$ fourth reaction product,

e. contacting said fourth reaction product with an aziridine characterized by the formula:



where R is hydrogen or ω-aminoalkyl of from 1 to 5 carbons at a temperature between about 25° and 130°C., utilizing a mole ratio of said fourth reaction product to aziridine of between about 3:1 and 1:2 to form said aziridine derivative.

7. An aziridine derivative in accordance with claim 1.

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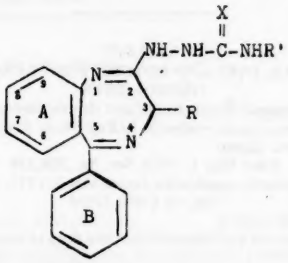
## 3,865,811
## 1,4-BENZODIAZEPINE DERIVATIVES

**Kanji Meguro, and Yutaka Kuwada, both of Hyogo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 90,422, Nov. 17, 1970, abandoned. This application Feb. 5, 1973, Ser. No. 329,411**
**Claims priority, application Japan, Nov. 18, 1969, 44-92366**
**Int. Cl. C07d** *53/06*
**U.S. Cl. 260—239 BD** **7 Claims**

1. A member selected from the group consisting of a compound of the formula



wherein rings A and B independently are unsubstituted or substituted by a member selected from the group consisting of halogen, nitro, trifluoromethyl, alkyl and alkoxy, R is hydrogen or lower alkyl, X is oxygen or sulfur and R′ is a member selected from the group consisting of alkyl of 1–8 carbon atoms, cycloalkyl of 3–8 carbon atoms, phenyl, naphthyl and phenyl lower alkyl,

a 4N-oxide thereof and a pharmaceutically acceptable salt thereof.

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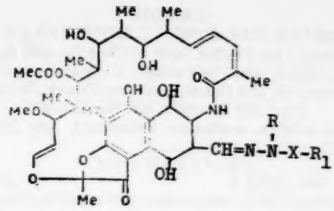
## 3,865,812
## 3-ACYLHYDRAZONOMETHYL RIFAMYCINS

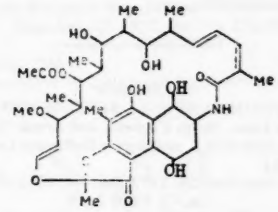
**Renato Cricchio, Varese, and Giancarlo Lancini, Pavia, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy**

**Filed Mar. 16, 1973, Ser. No. 342,047**
**Claims priority, application Italy, Mar. 27, 1972, 22421-A/72**
**Int. Cl. C07d** *87/54*
**U.S. Cl. 260—239.3 P** **1 Claim**

1. A rifamycin designated by the formula



and 25-desacetyl and 16, 17; 18, 19; 28, 29-hexahydro derivatives thereof, wherein Me represents methyl group; X represents a —CO—, —CS—, —C(:NH)— or an —$SO_2$— group; R represents hydrogen; $R_1$ represents 1 to 20 carbon atom alkyl, cyclopropyl, 1 to 20 carbon atom alkoxy, phenyl, naphthyl, substituted phenyl or substituted naphthyl wherein substituents are selected from 1 to 6 carbon lower alkyl, 3 to 6 carbon lower alkenyl, 3 to 10 carbon cycloalkyl, phenyl, amino, 1 to 6 carbon lower alkanoylamino, hydroxyamino, mono- and di-lower alkylamino, cyano, halo, nitro, 1 to 6 carbon lower alkoxy, methylenedioxy, sulfo, carboxy, carbamyl and sulfonamido; a 2 to 6 carbon alkyl group substituted with phenyl, substituted phenyl, naphthyl, or substituted naphthyl, as defined above; —$NR_2R_3$ wherein $R_2$ and $R_3$ independently designate hydrogen, $C_1$–$C_6$ lower alkyl, $C_3$–$C_6$ lower alkenyl, nitro, anilino, phenyl, o-tolyl, m-chlorophenyl or 3-fluoro-4-methylphenyl; —CO—NH—N=CH—A or —($R_4$)—CO—N-H—N=CH—A wherein $R_4$ is methylene, ethylene, cyclohexylene, or phenylene and A represents the rifamycin SV group:



or the corresponding 25-desacetyl and 16, 17; 18, 19; 28, 29-hexahydro derivative thereof; and where R and $R_1$ taken together with the adjacent —N—X-group designate 1,2,3,4-tetrahydro-3-oxo-2-isoquinolinyl or its 1-oxo isomer, 1-oxo-2-isoindolyl or 1,3-dioxo-2-isoindolinyl.

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## 3,865,813
## THIOUREA-ACYLATED POLYAMINE REACTION PRODUCT

**William C. Gergel, Mayfield Heights, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 696,159, Jan. 8, 1968, abandoned. This application Sept. 2, 1970, Ser. No. 69,160**
**Int. Cl. C01m** *1/38*
**U.S. Cl. 260—239.3 R** **1 Claim**

1. The process comprising reacting (A) a polyisobutenyl-substituted succinic acid acylated ethylene polyamine mixture characterized by an equivalent ratio of acid to polyamine of about 1:1 to 1:1.5, wherein the polyisobutenyl substituent has an average molecular weight of about 800–1,100, and (B) thiourea, the total amount of thiourea employed in the reaction mixture being such that the ratio of equivalents of thiourea to acylated ethylene polyamine is about 1–2:1–1.5.

**3,865,814**

## PROCESS FOR PREPARING N-SUBSTITUTED LACTAMS

**Heinz Lussi; Clau Berther, both of Chur/Gr, and Josef Studinka, Zurich, all of Switzerland, assignors to Inventa AG fur Forschung und Patentverwertung, Zurich, Switzerland**

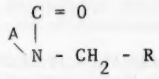
**Filed July 25, 1973, Ser. No. 382,461**

**Claims priority, application Switzerland, July 28, 1972, 11327/72**

**Int. Cl. C07d** *41/06*

**U.S. Cl. 260—239.3 R** **15 Claims**

**1.** A process for the preparation of N-substituted lactams of the formula



wherein A is a substituted or unsubstituted aliphatic hydrocarbon chain having 3 to 11 carbon atoms, said substituents comprising one or more alkyl groups each having 1 to 4 carbon atoms; and R is hydrogen or a hydrocarbon radical having 1 to 17 carbon atoms, comprising reacting at least one starting lactam of the formula

with an organic halogen compound of the formula

$X - CH_2 - R$

wherein X is chlorine, bromine or iodine, in the presence of an alkali metal hydroxide, in solid form or in aqueous solution containing at least 50% of said hydroxide, at a reaction temperature of from 20°C to 120°C.

**12.** A process according to claim **1** wherein said starting lactam is caprolactam.

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**3,865,815**

## 7-HYDROXYAMINO-1,4-BENZODIAZEPINES

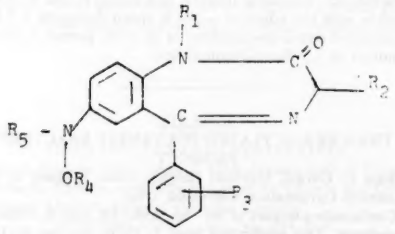
**Rodney Ian Fryer, North Caldwell, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Nov. 29, 1973, Ser. No. 420,118**

**Int. Cl. C07d** *53/06*

**U.S. Cl. 260—239.3 D** **13 Claims**

**1.** A compound of the formula



wherein $R_1$ signifies lower alkyl, hydroxylower alkyl, cycloalkyl-lower alkyl wherein the cycloalkyl group has 3 to 7 carbon atoms, lower alkoxy-lower alkyl or di-lower alkylaminolower alkyl; $R_2$ signifies hydrogen or lower alkyl; $R_3$ signifies hydrogen or halogen; $R_4$ signifies hydrogen or lower alkyl; $R_5$ signifies hydrogen or the group $—COR_6$, wherein $R_6$ is lower alkyl or halo-lower alkyl,

and the pharmaceutically acceptable acid addition salts thereof.

**3,865,816**

## 3-(3′,4′-DICHLORO-6′-ALKYL-PHENYL)-DELTA, 2-PYRAZOLINE DERIVATIVES

**Helmut Mengler, Frankfurt/Main, Germany, assignor to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt/Main, Germany**

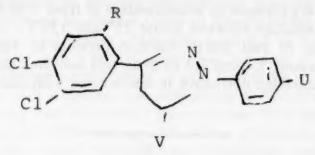
**Filed Sept. 7, 1972, Ser. No. 287,075**

**Claims priority, application Germany, Sept. 9, 1971, 2145019**

**Int. Cl. C07d** *49/00*

**U.S. Cl. 260—239.9** **8 Claims**

**1.** A compound of the formula



wherein:

R is lower alkyl;

V is hydrogen, lower alkyl, hydroxy-lower alkyl, halo-lower alkyl, phenyl, halophenyl, lower alkyl-phenyl, lower alkoxy-phenyl or sulfophenyl; and

U is $—SO_2—N\ Y_1\ Y_2$ wherein $Y_1$ and $Y_2$ each is hydrogen, lower alkyl, di(lower alkyl)-amino-lower alkylene, tri(-lower alkyl)-ammonium-lower alkylene, morpholino-lower alkylene, piperidino-lower alkylene, lower alkyl morpholinium-lower alkylene, or lower alkyl-piperidinium-lower alkylene.

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**3,865,817**

## OXONOL DYES AND PROCESS FOR PREPARING OXONOL DYES

**Teruo Kobayashi; Kazuo Inoue, and Hiroshi Sawaguchi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

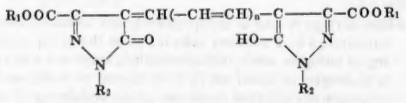
**Filed May 1, 1973, Ser. No. 356,226**

**Claims priority, application Japan, May 2, 1972, 46-43868**

**Int. Cl. C09b** *23/04*

**U.S. Cl. 260—240.2** **11 Claims**

**1.** An oxonol dye selected from the dyes of the formula



wherein $R_1$ represents a $C_1$–$C_{18}$ alkyl group, a phenyl group or a naphthyl group, $R_2$ represents a $C_1$–$C_6$ alkyl group having a sulfonic acid group or carboxyl group, *n* is 0, 1 or 2, and the methine chain may be substituted by an alkyl group, a phenyl group or a naphthyl group.

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**3,865,818**

## SUBSTITUTED BENZOXAZINES

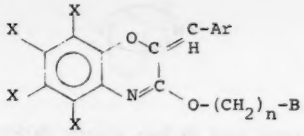
**John Krapcho, Somerset, and Chester F. Turk, Elizabeth, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Oct. 24, 1973, Ser. No. 409,101**

**Int. Cl. C07d** *87/50*

**U.S. Cl. 260—240 F** **13 Claims**

**1.** A compound of the formula



where X is selected from the group consisting of hydrogen, halogen, amino, nitro, hydroxy, trifluoromethyl, lower alkyl, and lower alkoxy; *n* is an integer from 2 to 5; Ar is selected from the group consisting of phenyl, X-substituted phenyl wherein X is as defined previously, pyridyl, thienyl, and furyl; and B is selected from the group consisting (lower alkyl-)amino, di(lower alkyl)-amino, pyrrolidino, piperidino, morpholino, 4-lower alkyl piperazino, and 4-(X-substituted phenyl)piperazino wherein X is as defined previously and N-oxides and pharmaceutically acceptable acid addition and quaternary salts thereof.

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**3,865,819**

## SUBSTITUTED SULFONYLACETAMIDO CEPHALOSPORINS

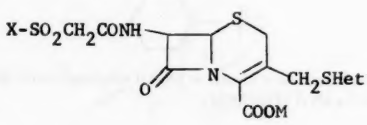
**Robert M. DeMarinis, King of Prussia, and John R. E. Hoover, Glenside, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed May 3, 1972, Ser. No. 249,858**

**Int. Cl. C07d** *99/24*

**U.S. Cl. 260—243 C** **11 Claims**

**1.** A compound of the structure:



where:

X is lower alkyl of $C_1$–$C_6$;

Het is a 5 or 6 membered heterocyclic ring containing one to four atoms selected from the group consisting of N, O, and S, unsubstituted or substituted with from one to two groups selected from the group consisting of lower alkyl, cycloalkyl or alkenyl, each having one to four carbon atoms; lower alkoxy or alkoxyalkyl, each alkyl or alkoxy having one to four carbon atoms; hydroxy; $CF_3$; NHR; $NR_2$; SR or halogen;

R is hydrogen or lower alkyl ($C_1$–$C_4$); and

M is hydrogen, alkali metal cation, or nontoxic ammonium cation.

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**3,865,820**

## ACYLAMINO-CEPHALOSPORANIC ACIDS

**Manfred Schorr, Frankfurt am Main, and Elmar Schrinner, Wiesbaden, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt/Main, Germany**

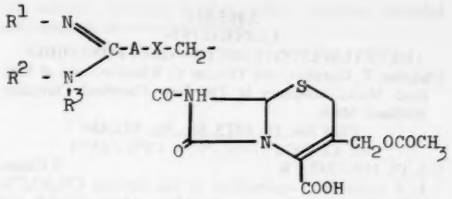
**Filed Apr. 14, 1972, Ser. No. 244,287**

**Claims priority, application Germany, Apr. 17, 1971, 2118635**

**Int. Cl. C07d** *99/24*

**U.S. Cl. 260—243 C** **8 Claims**

**1.** An acylaminocephalosporanic acid of the formula



and the physiologically tolerable salts thereof, wherein $R^1$ and $R^2$, taken alone, are hydrogen or alkyl having 1 to 5 carbon atoms or, taken together, are alkylene having 2 to 4 carbon atoms which may be substituted by alkyl having 1 to 4 carbon atoms which may contain an oxygen atom or by alkyl substituents having 1 to 4 carbon atoms closed to a ring which may be interrupted by an oxygen atom; $R^3$ is hydrogen or alkyl having 1 to 5 carbon atoms; A is phenylene or thienyl which may be substituted by alkyl having 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, or halogen; and X is an oxygen atom or a single bond.

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**3,865,821**

## PROCESS FOR THE PREPARATION OF DIHYDROMETOXAZINONE DERIVATIVES AND PRODUCTS SO OBTAINED

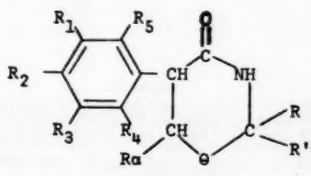
**Paul Cordier, Strasbourg; Louis Jung, Strasbourg Cronenbourg, and Raymond Hug, Eckbolsheim, all of France**

**Filed Aug. 23, 1972, Ser. No. 282,903**

**Int. Cl. C07d** *87/08*

**U.S. Cl. 260—244 R** **7 Claims**

**6.** A derivative of 2,3,5,6-tetrahydrometoxazinone of the formula:



in which $R_1$ is selected from the group consisting of H, $CH_3$, $OCH_3$, $SCH_3$ and OH; $R_2$ is selected from the group consisting of H, $CH_3$, $OCH_3$, $SCH_3$, Cl, F and OH; $R_3$ is selected from the group consisting of H, $OCH_3$, $SCH_3$, and OH; $R_4$ is selected from the group consisting of H, Cl, OH, $OCH_3$ and $SCH_3$; $R_5$ is selected from the group consisting of H, Cl, OH, $OCH_3$ and $SCH_3$; R$\alpha$ is selected from the group consisting of $COOCH_3$, $COOC_2H_5$, $COOC_3H_7$, $COOC_4H_9$, COONa, COOK, $CONH_4$, $CONH—NH_2$; R and R' are selected together from the group consisting of

| | |
|---|---|
| R= | —H, —$CH_3$; —$CH_2Cl$, —$C_2H_5$, —$C_3H_7$, —$C_4H_9$ |
| R'= | —$CH_3$, —$C_2H_5$, —$C_3H_5$, —$C_6H_4(OCH_3)p$, —$C_6H_4(Cl)p$, —$C_6H_4(SCH_3)p$ |

**3,865,822**

**1,1-DIHALO-1-(METHYLSULFONYL)METHANESULFONAMIDES**

**Christian T. Goralski, and Thomas C. Klingler, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jan. 10, 1973, Ser. No. 322,434**

**Int. Cl. C07d** *87/48, 29/34*; **C07c** *143/74*

**U.S. Cl. 260—247.1 R** **9 Claims**

1. A compound represented by the formula $CH_3SO_2CX_2SO_2NR_1R_2$ wherein X represents chloro or bromo and $R_1$ and $R_2$ independently represent hydrogen or 1 to 16 carbon atom alkyl, and together with the nitrogen atom represent a pyrrolidinyl, piperidinyl or morpholinyl heterocycle.

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**3,865,823**

**(2-NITRO-1-IMIDAZOLYL)-CARBAMATES**

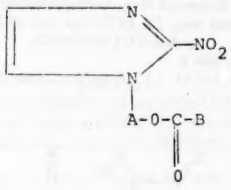
**Alden Gamaliel Beaman, East Princeton, Mass., and William Paul Tautz, New York, N.Y., assignors to Hoffmann-LaRoche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 312,406, Dec. 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 280,632, Aug. 14, 1972, Pat. No. 3,803,165. This application Nov. 29, 1973, Ser. No. 420,241**

**Int. Cl. C07d** *49/36*

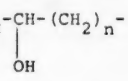
**U.S. Cl. 260—247.2 B** **47 Claims**

1. A (2-nitro-1-imidazolyl) carbamate represented by the formula



wherein

A represents a member of the group consisting of a polymethylene chain having from 2 to 6 carbon atoms;



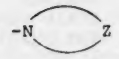
wherein *n* is an integer of 1 to 4;

and

wherein

R is selected from the group consisting of lower alkyl, halo-lower alkyl, halo-lower alkoxy-lower alkyl, lower alkoxy-lower alkyl;

and B represents a member selected from the group consisting of: (1) an amino radical selected from the group consisting of amino, mono-lower alkyl amino, di-lower alkyl amino, hydroxy lower alkyl amino, cycloalkylamino, aralkylamino, arylamino; and (2) a 5- or 6- membered nitrogen containing heterocycle represented by



wherein

Z represents lower alkylene, azalower alkylene, N-lower alkyl-aza-lower alkylene or oza-lower alkylene;

and pharmaceutically acceptable acid addition salts thereof.

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**3,865,824**

**2-ARYL-7-SUBSTITUTED PYRAZOLO [1.5A] 1,3,5-TRIAZINES**

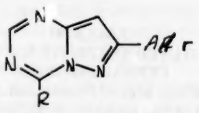
**Joze Kobe, Costa Mesa; Darrell E. O'Brien, Mission Viejo, and Roland K. Robins, Santa Ana, all of Calif., assignors to ICN Pharmaceuticals, Inc., Pasadena, Calif.**

**Filed Mar. 7, 1972, Ser. No. 232,632**

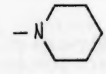
**Int. Cl. C07d** *57/34*

**U.S. Cl. 260—248 NS** **11 Claims**

1. A compound of the structure



wherein R is selected from the group consisting of SH; $NH_2$; OH; NH—$NH_2$; N=N=N; $SR_1$, $OR_1$, $NHR_1$ and $N(R_1)_2$ where $R_1$ is $C_1$-$C_6$ alkyl; and



; and wherein Ar is phenyl or phenyl substituted with halogen, $C_1$ to $C_6$ alkyl or methoxy.

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**3,865,825**

**PYRIMIDINYLPHRAZOLONE DERIVATIVE AND PROCESS OF PREPARING THE SAME**

**Tadamasa Hirayama, and Kiyoshi Nakagawa, both of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan**

**Filed July 31, 1972, Ser. No. 276,469**

**Claims priority, application Japan, July 31, 1971, 46-57675; Aug. 5, 1971, 46-59216**

**Int. Cl. C07d** *51/38*

**U.S. Cl. 260—256.4 C** **1 Claim**

1. 1-(4-methyl-6-hydroxy-2-pyrimidinyl)-3-methyl-pyrazoline-5-one.

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**3,865,826**

**CERTAIN DERIVATIVES OF PYRAZINYLMALONATES AND PYRAZINEACETIC ACIDS**

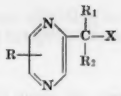
**Norman Schwartz, Philadelphia, and Richard J. Mohrbacher, Fort Washington, both of Pa., assignors to McNeil Laboratories, Incorporated, Ft. Washington, Pa.**

**Division of Ser. No. 774,486, Nov. 8, 1968, Pat. No. 3,761,477. This application Nov. 17, 1972, Ser. No. 307,685**

**Int. Cl. C07d** *87/40, 51/76*

**U.S. Cl. 260—247.5 D** **2 Claims**

1. A member selected from the group consisting of a compound of formula:



wherein R is a member selected from the group consisting of phenyl, chlorophenyl, dichlorophenyl, fluorophenyl, trifluoromethylphenyl, loweralkoxyphenyl, diloweralkoxyphenyl, loweralkylphenyl, diloweralkylphenyl, cyclohexyl and cyclopentyl; $R_1$ is a member selected from the group consisting of hydrogen and loweralkyl; $R_2$ is a member selected from the group consisting of hydrogen, loweralkyl, and X is morpholinocarbonyl.

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**3,865,827**

**PROCESS FOR PRODUCING QUANAZOLINONE DERIVATIVES**

**Michihiro Yamamoto, Toyonaka; Kikuo Ishizumi, Ikeda; Kazuo Mori, Kobe; Masao Koshiba; Shigeho Inaba, both of Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumimato Chemical Company, Limited, Osaka, Japan**

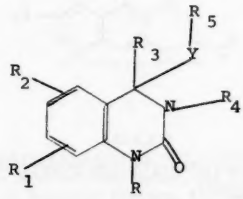
**Filed Dec. 13, 1971, Ser. No. 207,541**

**Claims priority, application Japan, Dec. 28, 1970, 45-129980**

**Int. Cl. C07d** *51/48*

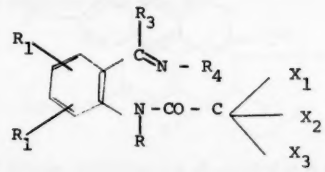
**U.S. Cl. 260—251 QA** **5 Claims**

1. A process for producing quinazolinone derivatives represented by the formula,



(I)

wherein R is hydrogen; $R_1$ and $R_2$ are independently hydrogen or halogen; $R_3$ is phenyl, $R_4$ is $C_{1-4}$ alkyl, $C_{3-5}$ alkenyl, benzyl, phenyl, $C_{1-4}$ alkylphenyl, $C_{1-4}$ alkoxyphenyl or piperidino-$C_{1-4}$ alkyl; $R_5$ is hydrogen or $C_{1-4}$ alkyl; and Y is oxygen, which comprises the step of reacting a compound of the formula,



(IV)

wherein $X_1$, $X_2$ and $X_3$ are the same or different halogen atoms and R, $R_1$, $R_2$, $R_3$ and $R_4$ are as defined above, with a compound of the formula,

$$R_5 - YH \qquad (V)$$

wherein R and Y are as defined above in a solvent selected from the group consisting of methanol, ethanol, isopropanol, tert-butanol, Cellosolve, diethylene glycol, methylene chloride, chloroform, carbon tetrachloride, ether, tetrahydrofuran, acetone, benzene, toluene, xylene, pyridine, dimethyl sulfoxide and dimethylformamide.

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**3,865,828**

**PYRIDINE DERIVATIVES HAVING ANTIDEPRESSANT ACTIVITY**

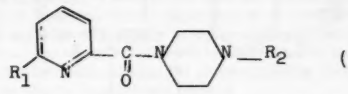
**Jeno Korosi; Gabriella Szabo Nee Czibula; Lay Nee Konya, Aranka; Lujza Erdelyi Nee Petocz; Bolya Balla Nee Kosoczky, and Eniko Kiszelly, all of Budapest, Hungary, assignors to EGYT Gyogyszervegyeszeti Gyar, Budapest, Hungary**

**Continuation-in-part of Ser. No. 236,953, March 22, 1972, abandoned. This application Nov. 1, 1972, Ser. No. 302,891**

**Int. Cl. C07d** *51/70*

**U.S. Cl. 260—268 C** **3 Claims**

1. A pyridine derivative selected from the group consisting of a compound of the formula



(I)

wherein $R_1$ is a member selected from the group consisting of hydrogen and methyl and $R_2$ is a member selected from the group consisting of hydrogen, methyl, hydroxy ethyl and benzyl, and a therapeutically acceptable acid addition salt thereof.

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**3,865,829**

**PROCESS FOR THE MANUFACTURE OF THE PURE ISOMERS OF NAPHTHOYLENE-BIS-BENZIMIDAZOLES**

**Dieter Wagner, Coventry, R.I., assignor to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt/Main, Germany**

**Filed June 16, 1969, Ser. No. 833,763**

**Int. Cl. C07d** *39/00*

**U.S. Cl. 260—282** **10 Claims**

1. A process for the preparation of pure cis- and trans-isomers of naphthoylene-bis-benzimidazole in a single reaction medium which comprises reacting naphthalene-1,4,5,8-tetracarboxylic acid or the anhydride thereof with 1,2-diaminobenzene or 1,2-diaminobenzene substituted by up to two members selected from the group consisting of chlorine, lower alkyl and lower alkoxy in a low-boiling alcohol at a temperature between about 120°C. and 180°C. at elevated pressure to form a reaction mixture of cis- and trans- isomers of said benzimidazole, adding to said reaction mixture an alkali metal hydroxide to form an insoluble alkali metal addition compound of the trans- isomer and a soluble alkali metal addition compound of the cis- isomer, separating said insoluble alkali metal addition compound from the reaction mixture, hydrolyzing each of said alkali metal addition compounds to form the respective benzimidazole isomers, and recoving each of said isomers.

## 3,865,830
## THIOPHOSPHAMIDE DERIVATIVES OF ISOQUINOLINE ALKALOIDS, METHOD OF PRODUCING AND APPLICATION THEREOF

**Nikolai Mikhailovich Turkevich, ulitsa Khasanskaya, 8, kv. 7; Maria Stepanovna Olievskaya, ulitsa Mironjuka, 44; Julia Maximovna Pashkevich, ulitsa Vishenskogo, II, kv. 5; Anatoly Ivanovich Potopalsky, prospekt Lenina, 35, kv. 5, and Vasily Mikhailovich Novitsky, ulitsa Verkhovinskaya, 7, kv. I, all of Lvov, U.S.S.R.**

**Division of Ser. No. 45,266, June 10, 1970, abandoned. This application June 20, 1972, Ser. No. 264,482**

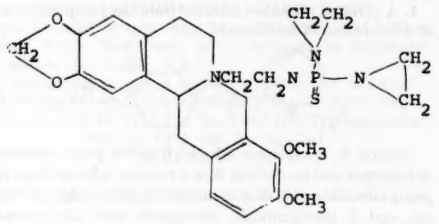
**Claims priority, application U.S.S.R., June 16, 1969, 1330542**

**Int. Cl. C07d** *39/00*

**U.S. Cl. 260—283 P** **3 Claims**

1. A method 9, wherein triethylenethiophosphoramide is reacted with berberine in dioxane at the boiling point of the latter, with a subsequent isolation of the formed di-[ethyleneimido]-N-berberinolethylamide of thiophosphoric acid.

3. A compound of the structure:



## 3,865,831
## 1,1',4,4'-TETRAHYDRO-4,4'-DIOXO(6,6'BIQUINOLINE)-,2'-DICARBOXYLATES

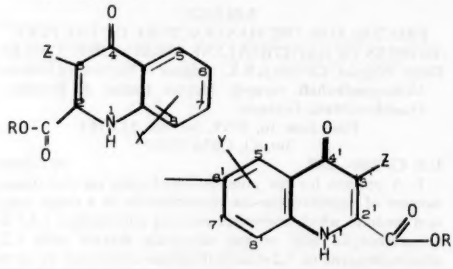
**Charles M. Hall, and Herbert G. Johnson, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed June 9, 1972, Ser. No. 261,524**

**Int. Cl. C07d** *33/46*

**U.S. Cl. 260—286 R** **6 Claims**

1. A compound of the formula



wherein

R is selected from the group consisting of hydrogen, alkyl from one to three carbon atoms, inclusive, phenyl, alkali metal or a pharmaceutically acceptable amine salt;

Z is selected from the group consisting of hydrogen, alkyl from one to three carbon atoms, inclusive, and phenyl;

X and Y are the same or different monosubstituents, and when X and Y are the same monosubstituent, it is selected from the group consisting of hydrogen, halogen, alkyl from one to three carbon atoms, inclusive, alkoxy from one to three carbons inclulsive, phenyl, nitro, trifluoromethyl, cyano and

where Q is selected from the group consisting of hydrogen alkyl from one to three carbon atoms, inclusive; phenyl, an alkali metal and a pharmaceutically acceptable amine salt, with the proviso that where R is hydrogen, alkali metal or an amine salt, then Q must be the same as R; with the further provision that when

a. X is at the 5 position, Y is at the 5' or 7' position,

b. X is at the 7 position, Y is at the 5' or 7' position

c. X is at the 8 position, Y is at the 8' position

and when X and Y are different, one monosubstituent must be hydrogen and the other monosubstituent is selected from the above group and can be located anywhere on the ring.

## 3,865,832
## SUBSTITUTED, 6,7 ETHYLENEDIOXY 4 HYDROXY 3 NON OXO CARBONYLIC QUINOLINES

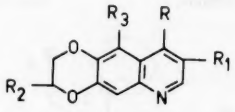
**Theodorus Antonius Cornelis Boschman, and Jacob Gerard Korsloot, both of van Houteniaan, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 5, 1973, Ser. No. 329,692**

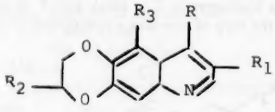
**Claims priority, application Netherlands, Feb. 9, 1972, 7201675; Nov. 14, 1972, 7215366**

**Int. Cl. C07d** *33/48*

**U.S. Cl. 260—287 R** **35 Claims**



1. A compound selected from the group consisting of quinolines of the formula



wherein R is hydroxy, $R_3$ is a substituent selected from the group consisting of hydrogen, halogen, trifluromethyl and nitro, $R_1$ is a substituent selected from the group consisting of alkoxycarbonyl, alkoxyalkoxycarbonyl, and carboxyl and $R_2$ is a substituent selected from the group consisting of alkoxyalkyl, alkoxyalkoxyalkyl, alkenylalkoxy, cycloalkylalkoxy and cycloalkenylalkoxy each of up to 6 carbon atoms and hydroxy alkyl of up to 4 carbon atoms, alkali metal salts thereof, tautomers thereof and acid addition salts thereof formed with pharmaceutically acceptable acids with the proviso that the number of carbons in the substituents defined by $R_1$ is at most four

when $R_3$ is a substituent other than halogen or trifluoromethyl and is six when $R_3$ is halogen or triflurometh yl.

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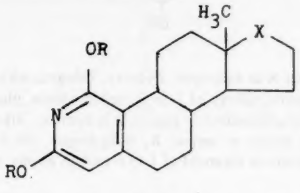
3,865,833
1,3-DIETHERS OF 2-AZAESTRATRIENES AND INTERMEDIATES

Robert J. Chorvat, Arlington Heights, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Feb. 20, 1973, Ser. No. 333,792
Int. Cl. C07d *101/00*
U.S. Cl. 260—289 AZ 4 Claims

1. A compound of the formula




wherein X represents carbonyl, β-hydroxymethylene, β-(lower alkanoyl)oxymethylene, α-(lower alkyl)-β-hydroxy=methylene, α-(lower alkynyl)-β-hydroxymethylene or α-propadienyl-β-hydroxymethylene and R denotes lower alkyl, lower cycloalkyl having 5–7 carbon atoms or tri-(lower alkyl)silyl.

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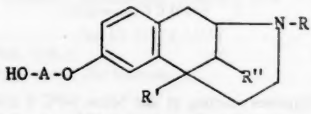
3,865,834
2'-[HYDROXYALKOXY]-6,7-BENZOMORPHANS

Hans-Werner Schubert; Otto Behner, and Friedrich Hoffmeister, all of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 37,332, May 14, 1970, abandoned. This application Jan. 5, 1973, Ser. No. 321,278
Claims priority, application Germany, May 17, 1969, 1925297
Int. Cl. C07d *39/00*
U.S. Cl. 260—293.54 5 Claims

1. A compound of the formula:




wherein

R is cyclopropylmethyl or cyclobutylmethyl;

R′ and R″ are the same or different, and are straight or branched chain hydrocarbons of 1 to 5 carbon atoms; and

A is straight or branched chain alkylene or alkylidene of 1 to 10 carbon atoms or alkenylene of 2 to 10 carbon atoms, unsubstituted or substituted by phenyl or phenyl substituted by lower alkyl, lower alkoxy, halogen, nitro or carbonylamino;

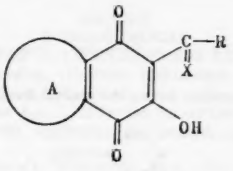
or a pharmaceutically acceptable non-toxic salt thereof.

3,865,835
QUINONE DERIVATIVES AND COMPOSITIONS CONTAINING THE SAME

Hideo Kano, Ibaraki; Masaru Ogata, Kobe, and Hisajiro Yukinaga, Kusatsu, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 220,708, Jan. 25, 1972,. This application Nov. 29, 1973, Ser. No. 419,971
Claims priority, application Japan, Feb. 9, 1971, 46-5389; Feb. 9, 1971, 46-5390; Feb. 9, 1971, 46-5393; Mar. 31, 1971, 46-19410
Int. Cl. C07d *33/46, 39/00*
U.S. Cl. 260—296 R 3 Claims

1. A compound of the formula:




wherein R is, pyridyl; X is a member selected from the group consisting of imino and lower alkylimino, A is a condensed aromatic ring selected from the group consisting of benzene and pyridine, and where A and R can be substituted by one to three substituents selected from the group consisting of lower alkyl, lower alkoxy, hydroxy and halogen.

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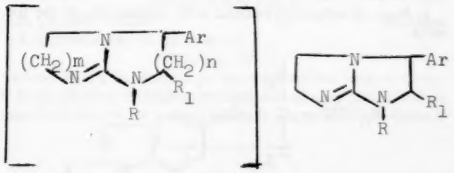
3,865,836
BICYCLIC IMIDAZOLES

Josephus Ludovicus Hubertus Van Gelder; Alfons Herman Margaretha Raeymaekers, both of Beerse; Roevens Leopold Frans Corneel, Rijkevorsel, and Willy Joannes Van Laerhoven, Ravels, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed Dec. 8, 1972, Ser. No. 313,285
Int. Cl. C07d *49/30, 51/16, 57/12*
U.S. Cl. 260—309.6 16 Claims

1. A member selected from the group of compounds having the formula:




and the therapeutically active acid addition salts therof, wherein:

R is a member selected from the group consisting of hydrogen and benzyl;

$R_1$ is a member selected from the group consisting of hydrogen and loweralkyl; and

Ar is a member selected from the group consisting of phenyl, loweralkylphenyl, halophenyl and di-halophenyl.

## 3,865,837
## PROCESS FOR PREPARING FISCHER'S BASE

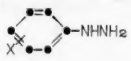
James J. Krutak, Sr., Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 186,400, Oct. 4, 1971, abandoned. This application Aug. 21, 1973, Ser. No. 390,293
Int. Cl. C07d 27/36, 27/38
U.S. Cl. 260—326.11 R 5 Claims

1. A method of preparing Fischer's base which comprises the steps of:

mixing one to 10 parts by weight of a polyphosphate ester prepared from $P_4O_{10}$ and an alcohol having one to five carbon atoms with one part by weight of substantially equimolar quantities of a composition having the general formula:

and a composition having the general formula:



heating said mixture to a temperature of between 160° C. and 200° C. at atmospheric pressure to render a homogeneous solution which includes Fischer's base,

wherein $R_1$ is an alkyl radical containing from one to four carbon atoms; $R_2$ is H or an alkyl radical containing from one to four carbon atoms; and X is H, 2- or 4-alkyl, alkoxy or alkylthio having from one to 18 carbon atoms, or 2- or 4-F, Br, Cl $NO_2$, $CO_2CH_2CH_3$, CN, $SO_2R$ wherein R is alkyl or aryl having one to 12 carbon atoms, $SO_2CF_3$, $SO_2CHF_2$, $CF_3$ or $SO_2NH_2$.

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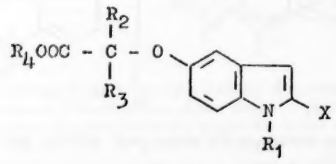
## 3,865,838
## (5-INDOLYLOXY)-ACETIC ACID COMPOUNDS AND THERAPEUTIC COMPOSITIONS

Alfred Popelak, Rimbach; Kurt Stach, Mannheim-Waldhof; Max Thiel, Mannheim; Wolfgang Schaumann, Heidelberg, and Harald Stork, Mannheim-Feudenheim, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed July 11, 1973, Ser. No. 378,356
Claims priority, application Germany, July 29, 1972, 2237361
Int. Cl. C07d 27/00, 27/56
U.S. Cl. 260—326.13 R 11 Claims

1. New (5-indolyloxy)-acetic acid compounds of the formula



wherein:

$R_1$, $R_2$, $R_3$ and $R_4$ are individually selected from hydrogen or lower alkyl;

X is hydrogen, carboxyl, or alkoxy carbonyl;

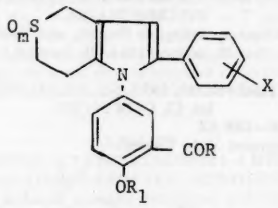
and the pharmacologically acceptable salts thereof.

## 3,865,839
## THIOPYRANOPYRROLYLSALICYCLIC ACIDS AND DERIVATIVES THEREOF

Richard C. Allen, Somerville, N.J., and Chandler R. Taylor, Jr., Mechanicsville, Va., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Mar. 1, 1973, Ser. No. 336,920
Int. Cl. C07d 27/54
U.S. Cl. 260—326.28 13 Claims

1. A compound of the formula



in which X is hydrogen, hydroxy, halogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, nitro, amino, trifluoromethyl or cyano, R is hydroxy, alkoxy of 1 to 6 carbon atoms or amino, $R_1$ is hydrogen, alkyl of 1 to 6 carbon atoms or alkanoyl of 1 to 6 carbon atoms, and m is 0, 1 or 2.

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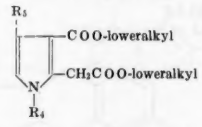
## 3,865,840
## PROCESS OF PREPARING 1,4-DILOWERALKYL-3-LOWERALKOXY-CARBONYL-2-CETATES

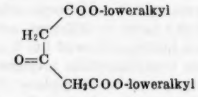
John Robert Carson, Norristown, Pa., assignor to McNeil Laboratories, Inc., Fort Washington, Pa.

Division of Ser. No. 5,958, Jan. 26, 1970, Pat. No. 3,752,826, which is a continuation-in-part of Ser. No. 741,348, July 1, 1968, abandoned, which is a continuation-in-part of Ser. No. 656,074, July 26, 1967, abandoned. This application Feb. 16, 1973, Ser. No. 338,461
Int. Cl. C07d 27/26
U.S. Cl. 260—326.46 5 Claims

1. The process of making a loweralkyl 1,4-diloweralkyl-3-loweralkoxycarbonyl-pyrrole-2-acetate of the formula:



which comprises reacting at just below 60°C a mixture of a loweralkylamine of the formula: $R_4—NH_2$ and a di-loweralkyl acetone dicarboxylate of the formula:

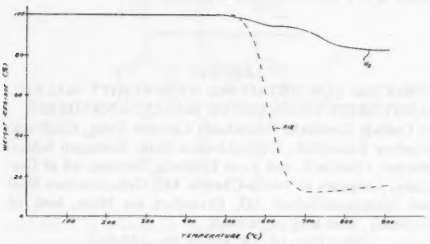


with a chloromethyl loweralkyl ketone of the formula: Cl—$CH_2$—CO—$R_5$, wherein the foregoing formulas said $R_4$ and said $R_5$ represent lower alkyl.

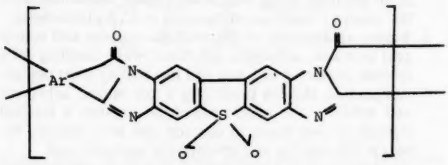
## 3,865,841
## BENZOTHIOPHENEDIOXIDEISOQUINOLINE POLYMERS

Albert J. Sicree, Dayton, and Fred E. Arnold, Centerville, both of Ohio, assignors to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.

Filed June 18, 1973, Ser. No. 371,089
Int. Cl. C08g 20/32
U.S. Cl. 260—78 TF 6 Claims



1. A thermally stable film or fiber-forming polymer consisting essentially of recurring units having the following formula:



wherein Ar is a tetravalent aromatic radical.

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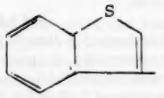
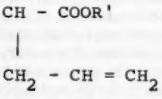
## 3,865,842
## BETA-[BENZO(B) THIENYL-3]-ALPHA-ALLYL-PROPIONIC ACID ESTERS

Max Fernand Robba, Paris, and Denise Jeanne Claude Duval, Yvelines, both of France, assignors to Innothera, Val de Marne, France

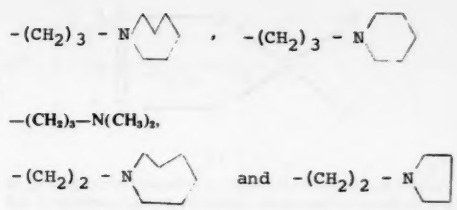
Filed June 7, 1971, Ser. No. 150,747
Claims priority, application France, June 12, 1970, 70.21679
Int. Cl. C07d 63/18
U.S. Cl. 260—330.5 4 Claims

1. A compound of the formula





wherein R' is selected from the group consisting of $-(CH_2)_3-N(C_2H_5)_2$, $-(CH_2)_2-N(C_2H_5)_2$,



$-(CH_2)_3-N(CH_3)_2$,



or pharmaceutically acceptable acid addition salts thereof.

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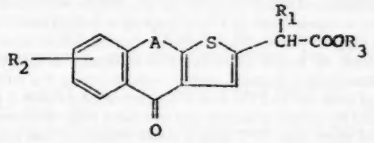
## 3,865,843
## 4-OXO-4H-BENZO [4.5]CYCLOHEPTA[1,2-B]THIOPHENE DERIVATIVES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland

Filed Apr. 2, 1973, Ser. No. 347,061
Claims priority, application Switzerland, Apr. 7, 1972, 5133/72
Int. Cl. C07d 63/18; A61k 27/00
U.S. Cl. 260—332.2 A 29 Claims

1. A compound of the formula



wherein

$R_1$ is hydrogen or lower alkyl,

$R_2$ is hydrogen, fluorine, chlorine, bromine, lower alkyl or lower alkoxy,

$R_3$ is hydrogen or lower alkyl, and

A is ethylene or vinylene, or, when $R_3$ is hydrogen a pharmaceutically acceptable salt thereof.

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## 3,865,844
## N-(THIENYLALKYL)-FLUOROALKANESULFONADMIES

Joseph Kenneth Harrington, Edina, and Robert D. Trepka, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 150,789, June 7, 1971, Pat. No. 3,766,193, which is a continuation-in-part of Ser. No. 795,050, Jan. 29, 1969, Pat. No. 3,629,332. This application July 12, 1973, Ser. No. 378,622
Int. Cl. C07d 63/12
U.S. Cl. 260—332.5 4 Claims

1. A compound of the formula

$$R_fSO_2NH—R—Ar$$

wherein $R_f$ is a fluoroalkyl group of one or two carbon atoms, R is an alkylene radical containing one or two carbon atoms and Ar is thienyl, or a horticulturally acceptable salt thereof.

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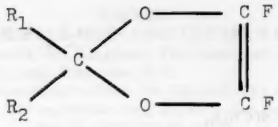
## 3,865,845
## FLUORINATED DIOXOLES

Paul Raphael Resnick, 2206 Fairfield Pl., Wilmington, Del. 19805

Continuation-in-part of Ser. No. 118,559, Feb. 24, 1971, abandoned. This application Aug. 1, 1973, Ser. No. 384,498
Int. Cl. C07d 13/08
U.S. Cl. 260—340.9 4 Claims

1. A fluorinated dioxole of the general formula



wherein $R_1$ and $R_2$ are the same or different both consisting of one to three carbon atoms which are perhalosubstituted and containing at least one fluorine atom whereby the perhalosubstituents consist of chlorine or fluorine atoms.

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**3,865,846**

**CONTINUOUS PRODUCTION OF DIKETENE**

**Gerhard Schulz; Guenther Matthias, Ludwigshafen; Werner Kasper, Frankenthal, and Erich Haarer, Bad Duerkheim, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft Ludwigshafen/Rhine, Germany**

**Filed Jan. 13, 1971, Ser. No. 106,244**

**Int. Cl. C07d** *3/00*

**U.S. Cl. 260—343.9** **8 Claims**

1. A process for the continuous manufacture of diketene by dimerization of ketene in diketene as a solvent wherein dimerization is carried out in a first stage at a temperature of not more than 40°C and with an initial concentration of more than 3 percent by weight of ketene with reference to diketene in the dimerization mixture, then in a second stage at a temperature of from 40° to 55°C with a concentration of from 3 to 1.2 percent by weight of ketene and in a third stage at a temperature of more than 55°C with a concentration of less than 1.2 percent by weight of ketene with reference to diketene in the dimerization mixture, and the recycle diketene has a content of at least 0.5 percent by weight of ketene with reference to diketene.

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**3,865,847**

**ETHYL FLUORO-(2-DIBENZOFURANYL)-ACETATE**

**Bruno Cavalleri, Milan; Elvio Bellasio, Albate, both of Italy; Emilio Testa, Ticino, Switzerland, and Giulio Maffii, Milan, Italy, assignors to Lepetit S.p.A.Gruppo per la Ricerca Scientifica e la Produzione Chemica Farmaceutica, Milan, Italy**

**Division of Ser. No. 750,009, Aug. 5, 1968, Pat. No. 3,699,151. This application Aug. 28, 1972, Ser. No. 284,090**

**Claims priority, application Great Britain, Aug. 14, 1967, 37197/67**

**Int. Cl. C07d** *5/44*

**U.S. Cl. 260—346.2 M** **1 Claim**

1. The compound ethyl fluoro-(2-dibenzofuranyl)-acetate.

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**3,865,848**

**METHYLENATION REAGENT**

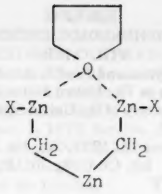
**Leonard N. Nysted, Highland Park, Ill., assignor to G. D. Searle & Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 865,991, Oct. 13, 1969, abandoned, which is a continuation-in-part of Ser. No. 675,778, Oct. 17, 1967, abandoned. This application Feb. 5, 1973, Ser. No. 329,404**

**Int. Cl. C07d** *5/02*

**U.S. Cl. 260—346.1 M** **3 Claims**

1. A compound of the formula



wherein X is a chloro or bormo radical.

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**3,865,849**

**A PROCESS FOR OBTAINING HIGH-PURITY MALEIC ANHYDRIDE FROM CRUDE MALEIC ANHYDRIDE**

**Otto Ludwig Garkisch, Neuenhain; Gunther Ibing, Gladbeck; Gunther Kammholz, Gelsenkirchen-Buer; Hermann Schirrmacher, Gladbeck, and Kurt Lohbeck, Bottrop, all of Germany, assignors to Verba-Chemie AG, Gelsenkirchen-Buer and Metallgesellschaft AG, Frankfurt am Main, both of, Germany, part interest to each**

**Filed Dec. 13, 1971, Ser. No. 207,025**

**Claims priority, application Germany, Dec. 12, 1970, 2061335**

**Int. Cl. C07c** *57/14*

**U.S. Cl. 260—346.8 M** **5 Claims**

1. A maleic anhydride purification method, comprising the steps of:

a. deriving a crude maleic anhydride containing maleic acid as an impurity along with other organic impurities from the catalytic oxidation of benzene or $C_4$ hydrocarbons,

b. heating said mixture to thermally decompose said maleic acid to maleic anhydride and water, while distilling off a forerun consisting of water and low-boiling point organic compounds, thereby producing a raw maleic anhydride and refluxing the maleic anhydride to form a residual mixture in two stages in cascade and at a pressure between 100 mm Hg and atmospheric pressure; and

c. thereafter and at a later time than step (b) continuously distilling maleic anhydride from said residual mixture and producing a sump product containing principally maleic acid and fumaric acid at a pressure between 60 and 200 mm Hg, the pressure in the cascade stage being higher than that in step (c).

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**3,865,850**

**2-HYDROXY-3,3-DIMETHYL-4-OXOTETRAHYDROFURAN PRODUCTION**

**Franz Merger, Ludwigshafen, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/-Rhein, Germany**

**Division of Ser. No. 107,592, Jan. 18, 1971, abandoned. This application Mar. 2, 1973, Ser. No. 337,379**

**Claims priority, application Germany, Jan. 28, 1970, 2003600**

**Int. Cl. C07d** *5/04*

**U.S. Cl. 260—347.8** **6 Claims**

1. A process for production of 2-hydroxy-3,3-dimethyl-4-oxotetrahydrofuran which consists essentially of reacting isobutyraldehyde and glyoxal at a molar ratio of 1:1 to 4:1, respectively, at 10°–150°C. in the presence of 0.02 to 0.1 mol equivalents of a tertiary amine per mol of isobutyraldehyde and in the presence of 35–60% by weight of water with reference to the glyoxal to obtain as reaction products a mixture of 2,2-dimethyl-3-hydroxysuccinaldehyde and 2-hydroxy-3,3-dimethyl-4-oxotetrahydrofuran, and separating the latter compound from the reaction mixture.

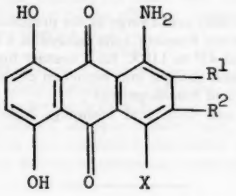
3,865,851

## MANUFACTURE OF ANTHRAQUINONE COMPOUNDS

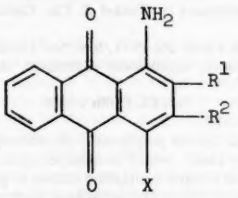
Kenneth Dunkerley, and Ronald Wynford Kenyon, both of Blackley, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 1, 1972, Ser. No. 285,625
Claims priority, application Great Britain, Sept. 27, 1971, 44881/71
Int. Cl. C07c *97/14*
U.S. Cl. 260—280 1 Claim

1. Process for the manufacture of an anthraquinone compound of the formula



wherein X is a hydroxy or amino group, and R and R are independently selected from hydrogen, chlorine and bromine, which comprises subjecting a di(boro-loweralkylcarbonyloxy) complex of a compound of the formula



to the action of an oxidizing agent selected from potassium persulfate, manganese dioxide and lead dioxide in oleum at a temperature between 10 C and 30 C and thereafter hydrolyzing off the boro-lower alkylcarbonyloxy groups by pouring the reaction mixture into a mixture of ice and water.

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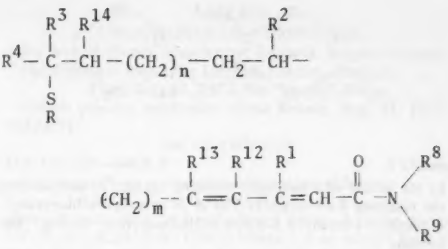
3,865,852

## NOVEL PRODUCTS

Clive A. Henrick, and John B. Siddall, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 256,605, May 24, 1972, which is a continuation-in-part of Ser. No. 201,189, Nov. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 191,812, Oct. 22, 1971, abandoned. This application Oct. 9, 1973, Ser. No. 404,632
Int. Cl. C08h *9/02, 3/00*
U.S. Cl. 260—402.5 6 Claims

1. A compound selected from those of the following formula:



wherein,
each of *m* and *n* is 0 or the positive integer 1,, 2, or 3;
R is hydrogen, lower alkyl, cycloalkyl, aralkyl or aryl;
each of R and R is lower alkyl;
each of R , R , R and R is hydrogen or lower alkyl;
R is alkyl; and
each of R and R is hydrogen, alkyl, alkenyl, or cycloalkyl.

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3,865,853

## HYDROGENATION OF FATTY ACIDS AND THEIR TRIGLYCERIDES USING A PD(II) CATALYST IN AN ION-EXCHANGE RESIN

Adrien George Hinze, Dordrecht, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Jan. 24, 1973, Ser. No. 326,316
Claims priority, application Great Britain, Jan. 25, 1972, 3426/72
Int. Cl. C11c *3/12*; B01j *11/16*; C08f *27/06*
U.S. Cl. 260—409 1 Claim

1. A process for hydrogenating polyunsaturated fatty acids and their triglyceride esters at about 0 C to about 100 C using about 1 to about 5 atms. hydrogen in the presence of a polar solvent and a supported heavy-metal catalyst in which the heavy-metal is Pd(II), the catalyst-support is an ion-exchange resin consisting essentially of a polystyrene matrix cross-linked with divinyl benzene and at least 2.0 meq/g active sites readily accessible to large molecules and the Pd(II) has been introduced into the salt-form of the resin when the resin is a cationexchange and into the hydroxyl or neutral form when the resin is an anion-exchange resin.

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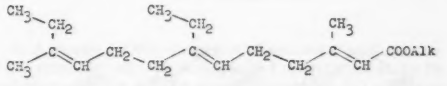
3,865,854

## PROCESS OF PREPARATION OF ALKYL TRIDECATRIENOATES AND INTERMEDIATES

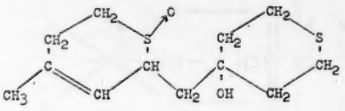
Daniel Hainaut, Villemomble; Edmond Toromanoff, Paris, and Jean-Pierre Demoute, Montreuil-Sous-Bois, all of France, assignors to Roussel-Uclaf, Paris, France

Filed Sept. 5, 1972, Ser. No. 286,439
Claims priority, application France, Sept. 7, 1971, 71.32261
Int. Cl. C07c *67/00, 65/08*
U.S. Cl. 260—410.9 R 12 Claims

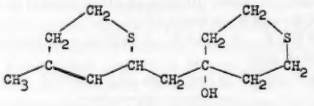
1. A process for the production of alkyl tridecatrienoates having the formula



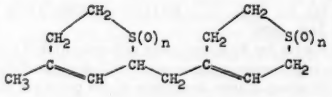
wherein Alk represents alkyl having 1 to 5 carbon atoms which consists of the steps of (1) condensing the S-oxide of 4-methyl-5,6-dihydro-2H-thiapyran with 1-oxa-6-thiaspiro/2,5/octane in the presence of a strong base, (2) reducing the resulting S-oxide of 2(4 -hydroxy-3 ,4 ,5 ,6 -tetrahydrothiapyranyl-4 -methyl)-4-methyl-5,6-dihydro-2H-thiapyran having the formula



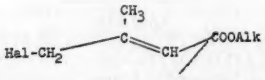
by the action of a sulfoxide reducing agent, (3) dehydrating the resulting 2-(4'-hydroxy-3',4',5',6'-tetrahydrothiapyranyl-4'-methyl)-4-methyl-5,6-dihydro-2H-thiapyran having the formula



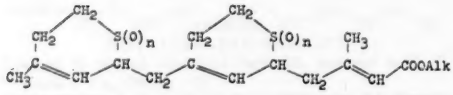
by the action of a dehydrating agent to form a dithiapyranic compound having the formula



wherein *n* is 0 (4) and reacting the same with a butenoate having the formula



wherein Alk represents alkyl having 1 to 5 carbon atoms and Hal represents a halogen selected from the group consisting of chlorine and bromine, in the presence of a strong base, (5) subjecting the resulting di-thiapyranic ester compound having the formula



wherein alk and n have the above-assigned values, to the action of a desulfurizing agent and (6) recovering said alkyl tridecatrienoates.

**3,865,855**

## PROCESS FOR CATALYTICALLY CONVERTING FATTY ACIDS

**Carl B. Linn, and Fred Baiocchi, both of Shawnee Mission, Kans., assignors to C. J. Patterson Company, Kansas City, Mo.**

**Continuation-in-part of Ser. No. 191,546, Oct. 21, 1971, abandoned. This application Nov. 5, 1973, Ser. No. 413,005**

**Int. Cl. C08h** *17/36*

**U.S. Cl. 260—413** **12 Claims**

1. In a process for converting a fatty acid charge to straight and branched chain monocarboxylic fatty acid homologs of the charge with a Friedel-Crafts catalyst, the improvement, comprising:

reacting the fatty acid charge in the presence of a catalytic amount of the Friedel-Crafts catalyst at a temperature of from about 45° to 110°C for a contact time sufficient to produce said straight and branched chain monocarboxylic fatty acid homologs; and

recovering said fatty acid homologs from said reaction mixture.

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**3,865,856**

## PROCESS FOR THE PREPARATION OF CARBOXYLIC ACIDS FROM VICINAL DIOLS

**Manfred Dohr, Dusseldorf-Holthausen; Ulrich Zeidler, Dusseldorf-Benrath, and Herbert Lepper, Cologne-Mulheim, all of Germany, assignors to Henkel & Cie. GmbH, Dusseldorf, Germany**

**Filed July 26, 1971, Ser. No. 166,309**

**Claims priority, application Germany, Aug. 1, 1970, 2038296**

**Int. Cl. C08h** *17/36*

**U.S. Cl. 260—413** **6 Claims**

1. A process for the preparation of carboxylic acids of at least 5 carbon atoms, which consists essentially of continuously passing an oxygen-containing stream of gas into contact with a solution of vicinal diols of at least 6 carbon atoms in an organic solvent whose boiling point lies at least 30°C above the operating temperature selected from the group consisting of paraffin hydrocarbons of at least 5 carbon atoms and alkanoic acids of at least 5 carbon atoms, with the quantitative ratio of vicinal diol to solvent being from 1:1 to 1:20, at a temperature between 40°C and 200°C whereby the intermediately formed aldehyde is retained in said solution, in the presence of a catalyst consisting of the cobalt salt of a carboxylic acid having at least two carbon atoms, which catalyst salt is soluble in said reaction mixture, continuously removing water of reaction and low-boiling oxidation products from the reaction mixture with said stream of gas, and recovering said carboxylic acids of at least 5 carbon atoms.

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**3,865,857**

## TRI-SUBSTITUTED ALUMINUM SALTS OR DI-SUBSTITUTED ALUMINUM SALTS OF CARBOXYL GROUP-CONTAINING, PHARMACEUTICALLY EFFECTIVE COMPOUNDS, AND PROCESS FOR PREPARATION THEREOF

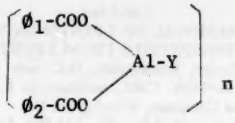
**Yasushi Suzuki, Yokohama, and Toshihisa Itaya, Kawasaki-shi, both of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan**

**Filed Mar. 20, 1972, Ser. No. 236,347**

**Int. Cl. C07f** *5/06*

**U.S. Cl. 260—448 R** **15 Claims**

1. A process for the preparation of aluminum salts of carboxyl group-containing, pharmaceutically effective compounds expressed by the formula:



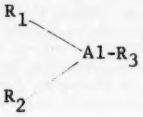

wherein Y represents a hydroxyl group or a group -OOC-$\phi_3$; $\phi_2$ and $\phi_3$, which may be the same or different, represent carboxyl group-free residues of a carboxyl groupcontaining, pharmaceutically effective compound; and $n$ is a number of 1 or more,

which comprises reacting at least one carboxyl group-containing, pharmaceutically effective compound expressed by the following formula:

$$\phi\text{-COOH}$$

wherein $\phi$ represents a carboxyl group-free residue of a carboxyl group-containing, pharmaceutically effective compound, selected from at least one of the groups consisting of alkenyl, alicyclic hydrocarbon, fused alicyclic hydrocarbon, and aromatic hydrocarbon moieties,

with an organic aluminum compound expressed by the formula:




wherein $R_1$ and $R_2$, which may be the same or different, represent an aliphatic, alicyclic or aromatic hydrocarbon residue having up to 10 carbon atoms, and $R_3$ represents a hydrocarbon residue as defined with respect to $R_1$ and $R_2$, which may be the same as, or different from, $R_1$ and $R_2$, or a hydrocarbyloxy group of the formula $OR_4$ in which $R_4$ is an aliphatic, alicyclic or aromatic hydrocarbon residue having up to 10 carbon atoms, in an atmosphere of an inert gas and under anhydrous conditions, and, when the reaction product is a di-substituted aluminum salt of said carboxyl group-containing, pharmaceutically effective compound, hydrolyzing the same;

with the proviso that, where a low polymer is obtained, the aluminum salt monomers are polymerized through coordination bonds.

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**3,865,858**

## HYDROSILYLATION EMPLOYING DICARBONYLDICHLOROPLATINUM AS A CATALYST

**Andreas Ossko; Heinz Goller, both of Cologne; Joachim Herzig, Leichlingen; Werner Buchner, Opladen-Luetzenkirchen, and Armand deMontigny, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Oct. 2, 1973, Ser. No. 402,665**

**Claims priority, application Germany, Oct. 19, 1972, 2251297**

**Int. Cl. C07g** *7/08*

**U.S. Cl. 260—448.2 E** **3 Claims**

1. In the production of an organosilicon compound by addition of a silicon compound selected from the group consisting of a hydrogenosilane and a hydrogenosiloxane to an olefinically unsaturated organic compound in the presence of a catalytically active platinum compound, the improvement which comprises employing dicarbonyldichloroplatinum as the platinum compound.

**3,865,859**

## ORGANO-SILICON COMPOUNDS

**John Beckett Plumb, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Aug. 24, 1972, Ser. No. 283,288**

**Claims priority, application Great Britain, Aug. 31, 1971, 40534/71**

**Int. Cl. C07f** *7/18*

**U.S. Cl. 260—448.8 R** **8 Claims**

1. Organosilicon compounds of the general formula

$$(R_aSi)_xO_{z(r-a)}[(C_nH_{2n}O)_yH]_zA_{x(4-a)-z/2\ trap.}$$

where $R$ is an alkyl, aryl and alkenyl group; A is the group $[(C_nH_{2n}O)_{y-1}C_nH_{2n}]$ or $(C_5H_{10})$ where n is an integer from 2 to 4 and y is an integer from 1 to 5; $a$ is 0 or 1; $x$ is an integer from 1 to 10; and $z$ is an integer which when a is 1 is not greater than $x + 2$ and when a is 0 is not greater than $2x + 2$.

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**3,865,860**

## SUBSTITUTED SULFONYLGLYCOLIC ACID ANILIDES

**Wolfgang Rohr, Mannheim, and Adolf Fischer, Mutterstadt, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany**

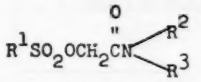
**Filed Nov. 29, 1972, Ser. No. 310,640**

**Claims priority, application Germany, Dec. 6, 1971, 2160380**

**Int. Cl. C07c** *143/24, 143/38*

**U.S. Cl. 260—456 A** **6 Claims**

1. A N-substituted sulfonylglycolic acid anilide of the formula




where $R^1$ denotes alkyl, cycloalkyl, haloalkyl alkenyl or haloalkenyl, $R^2$ denotes phenyl which may be substituted by alkyl, and $R^3$ denotes alkynyl.

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**3,865,861**

## SULPHATION OF SECONDARY ALCOHOLS

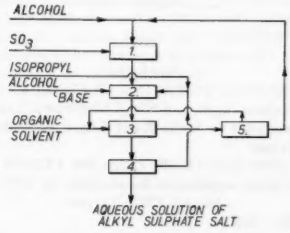
**Austen E. Sowerby, Distington, England, assignor to Albright & Wilson Ltd., Birmingham, England**

**Filed Apr. 16, 1968, Ser. No. 721,670**

**Claims priority, application Great Britain, Apr. 25, 1967, 19025/67**

**Int. Cl. C07c** *141/04*

**U.S. Cl. 260—459** **17 Claims**




1. A process for the production of monoalkyl sulphate salts from secondary alkanols having from 8 to 26 carbon atoms by reaction with free sulphur trioxide comprising (1) adding to the secondary alkanol free sulphur trioxide in an amount sufficient to react with from 20 to 80 percent of the secondary alkanol present, the reaction being carried out at a temperature not greater than 50°C, (2) neutralising the reaction mixture so formed with an aqueous solution of a base selected from the group consisting of aqueous solutions of alkalis, and amines, which is inert to the unreacted alkanol; (3) separating the unreacted alkanol from the salt of the alkyl sulphate formed by contacting said unreacted alkanol and said salt of

the said alkyl sulphate formed with a solvent which is immiscible with water and which will dissolve said unreacted alkanol and will not dissolve said salt of the alkyl sulphate; and (4) recycling the unreacted alkanol separated in stage (3) of the process to stage (1).

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3,865,862

## PROCESS FOR PREPARING MONOFORMYLDIAMINOMALEONITRILE

Yozo Ohtsuka, Kanagawa, Japan, assignor to Sagami Chemical Research Center, Tokyo, Japan

Filed Nov. 5, 1973, Ser. No. 413,063
Claims priority, application Japan, Nov. 7, 1972, 47-110772
Int. Cl. C07c *121/02*
U.S. Cl. 260—465.4 2 Claims

1. In a process for preparing monoformyldiaminomaleonitrile comprising reacting diaminomaleonitrile with formic acid, the improvement which comprises heating diaminomaleonitrile and formic acid in an amount of 1 to 4 moles of formic acid per 1 mole of said nitrile in a non-polar aprotic solvent having a solubility of formic acid of less than 10 percent by weight at room temperature at a temperature of from 0° to 100°C under substantially anhydrous conditions for a period of 5 minutes to 1 hour.

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3,865,863

## 2-(BENZOYL)-3-DIMETHYLAMINOACRYLONITRILES

George Francis Field, West Caldwell, and Joachim Ulrich Schneider, West Paterson, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 22, 1972, Ser. No. 265,117
Int. Cl. C07c *121/78*
U.S. Cl. 260—465 E 12 Claims

1. 2-(2-methoxybenzoyl)-3-dimethylaminoacrylonitrile.
2. 2-(2-chlorobenzoyl)-3-dimethylaminoacrylonitrile.

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3,865,864

## PROCESS FOR PRODUCING CYANOALKADIENES

Hitoshi Nakajima, Ageo, and Hiroji Nishimaru, Tokyo, both of Japan, assignors to Asaki Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 11, 1971, Ser. No. 152,450
Claims priority, application Japan, June 16, 1970, 45-51509
Int. Cl. C07c *121/04*
U.S. Cl. 260—465.3 8 Claims

1. A process for the selective introduction of a single cyano group at a terminal unsaturated carbon atom of a diolefin selected from the group consisting of 1,3-butadiene, isoprene and 1,3-pentadiene, whereby there is produced a 1-monocyanoalkadiene which comprises treating said diolefin in the vapor phase at a temperature of from 100° to 600°C with 0.02 to 1.5 mols hydrogen cyanide per mol of said diolefin and 0.5 to 5.0 mols oxygen per mol hydrogen cyanide in the presence of a palladium catalyst selected from the group consisting of palladium metal, palladium oxide, palladium hydroxide, palladium sulfate, palladium nitrate, palladium cyanide, palladium chloride palladium bromide, palladium iodide, palladium acetate, palladium chloroacetate, potassium chloropalladate and cesium chloropalladate.

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3,865,865

## SELECTIVE REMOVAL OF 2-PENTENENITRILE AND 2-ETHYL-2-BUTENENITRILE FROM 3-PENTENENITRILE

Michael T. Musser, Wilmington, Del., and Andrew Streitwieser, Jr., Berkeley, Calif., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 332,580, Feb. 15, 1973, abandoned. This application Feb. 1, 1974, Ser. No. 438,941
Int. Cl. C07c *121/30*
U.S. Cl. 260—465.9 12 Claims

1. A process for the recovery of 3-pentenenitrile substantially free of 2-pentenenitrile and 2-methyl-2-butenenitrile by the selective removal of 2-pentenenitrile and 2-methyl-2-butenenitrile from a mixture of alkenyl nitriles comprising 2-pentenenitrile and 2-methyl-2-butenenitrile and 3-pentenenitrile and 4-pentenenitrile which comprises contacting the mixture of nitriles with an aqueous solution of a treating agent consisting essentially of a compound selected from the group consisting of an alkali metal sulfite, an alkali metal bisulfite, ammonium sulfite, ammonium bisulfite and mixtures thereof, the sulfite and bisulfite total concentration being about 0.1 to about 5 molar for a period of from about 1 minute to 24 hours, the solution having a pH in the range of 3 to 11, at a temperature in the range of 20°C. to 200°C. to produce an aqueous phase containing an adduct selected from the group consisting of a water-soluble bisulfite adduct of 2-pentenenitrile, a water-soluble bisulfite adduct of 2-methyl-2-butenenitrile and mixtures thereof and an organic phase comprising 3-pentenenitrile; separating the aqueous phase from the organic phase and recovering 3-pentenenitrile substantially free of 2-pentenenitrile and 2-methyl-2-butenenitrile from the organic phase.

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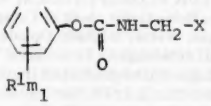
3,865,866

## CARBAMIC ACID ESTERS

Toshiaki Ozaki; Katsuzo Kamoshita, both of Toyonaka; Katsutoshi Tanaka, Takarazuka; Sigeo Yamamoto, Toyonaka; Tadashi Ooishi; Shinji Nakai, both of Takarazuka, and Keiichiro Akiba, Ikeda, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

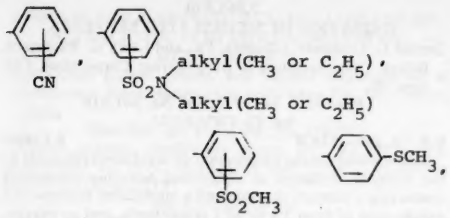
Filed Jan. 25, 1971, Ser. No. 109,622
Claims priority, application Japan, Jan. 30, 1970, 45-8618; Feb. 20, 1970, 45-15120; Mar. 19, 1970, 45-23730; Mar. 24, 1970, 45-25119; Apr. 13, 1970, 45-31694; Apr. 13, 1970, 45-31695
Int. Cl. C07c *79/46*, *101/00*
U.S. Cl. 260—471 C 5 Claims

1. A carbamic acid ester having the formula,

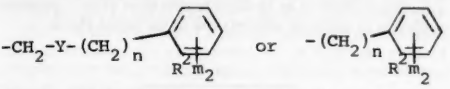


wherein

is selected from the group consisting of




2-cyano-4-chlorophenyl and 2-methoxy-4-cyanophenyl and X is a group of the formula,




wherein Y is an oxygen or sulfur atom; $R^2$ is a hydrogen, chlorine, methyl or methoxy; $m_2$ is an integer of 1 or 2; and $n$ is 0 or 1.

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**3,865,867**

**META-BIFUNCTIONAL BENZENES**

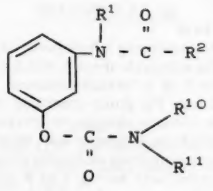
**John F. Olin, Ballwin, and Philip C. Hamm, Glendale, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation of Ser. No. 647,202, June 19, 1967, abandoned. This application May 26, 1970, Ser. No. 40,742**

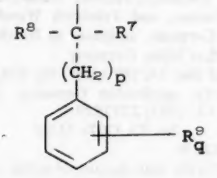
**Int. Cl. C07c** *125/06*

**U.S. Cl. 260—472** **12 Claims**

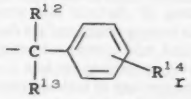
**1.** A compound of the formula



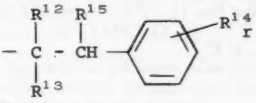
wherein $R^1$ is selected from the group consisting of hydrogen and alklyl having a maximum of 6 carbon atoms; $R^2$ is selected from the group consisting of hydrogen, alkyl having a maximum of 12 carbon atoms, alkenyl having a maximum of 8 carbon atoms, alkynyl having a maximum of 6 carbon atoms and haloalkyl having a maximum of 6 carbon atoms and a maximum of 3 halogen atoms, cycloalkyl and alkylcycloalkyl having 3 to 7 ring carbon atoms and a maximum of 4 chain carbon atoms; phenyl and substituted phenyl having a maximum of 2 substituents, said substituent being selected from the group consisting of halogen, alklyl having a maximum of 4 carbon atoms and aralkyl of the formula



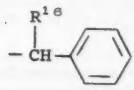
wherein $R^7$ is selected from the group consisting of hydrogen, alkyl having a maximum of 4 carbon atoms, alkenyl having a maximum of 3 carbon atoms and haloalkyl having a maximum of 4 carbon atoms and a maximum of 3 halogen atoms, $R^8$ is selected from the group consisting of hydrogen, alkyl having a maximum of 4 carbon atoms; $R^9$ is independently selected from the group consisting of alkyl having a maximum of 4 carbon atoms, alkoxy having a maximum of 2 carbon atoms and halogen; $p$ is one of the integers zero to one; and $q$ is one of the integers zero to two; and $R^{10}$ is selected from the group consisting of



wherein $R^{12}$ and $R^{13}$ are each independently selected from the group consisting of hydrogen, alkyl having a maximum of 4 carbon atoms, alkenyl having a maximum of 3 carbon atoms, chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 3 carbon atoms and 3 halogen atoms, provided that only one of $R^{12}$ and $R^{13}$ can be alkenyl or chloroalkenyl; $R^{14}$ is selected from the group consisting of halogen, alkyl having a maximum of 4 carbon atoms, nitro, alkoxy having a maximum of 3 carbon atoms, and $r$ is one of the integers zero to two; the group



wherein $R^{15}$ is selected from the group consisting of alkyl and alkenyl each having a maximum of 4 carbon atoms, provided that $R^{15}$ is other than alkenyl where either $R^{12}$ or $R^{13}$ is alkenyl or chloroalkenyl, and $R^{12}$, $R^{13}$, $R^{14}$ and $r$ are as previously defined; and the group



wherein $R^{16}$ is selected from the group consisting of phenyl and naphthyl; $R^{11}$ is selected from the group consisting of hydrogen, alkyl having a maximum of 6 carbon atoms, alkenyl having a maximum of 4 carbon atoms and chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 4 carbon atoms and a maximum of 3 halogen atoms.

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**3,865,868**

**PRODUCTION OF UNSATURATED ESTERS**

**Jack Lewis, Cambridge, England, assignor to Imperial Chemical Industries Limited, London, England**

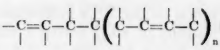
**Filed Feb. 26, 1973, Ser. No. 336,046**

**Claims priority, application Great Britain, Mar. 13, 1972, 11591/72**

**Int. Cl. C07c** *69/44, 69/78, 69/80*

**U.S. Cl. 260—475 N** **8 Claims**

**1.** A process for the production of unsaturated esters containing one or more groups



in which *n* is 1 which comprises reacting an acyclic conjugated diolefine selected from the group consisting of butadiene, isoprene and piperylene with a carboxylic acid selected from the group consisting of aliphatic and aromatic mono- and di-carboxylic acids in the presence of ethylene and a platinum or iridium compound, said compound being a halide, a lower alkanoate of an acid containing up to 6 carbon atoms or an organocomplex, the amount of said compound in the reaction solution being from $10^{-7}$ to 1.0 molar.

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**3,865,869**

## WATER-SOLUBLE DIELECTRIC RESINS

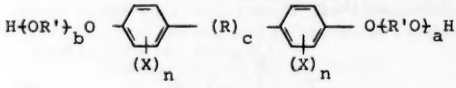
**Erich Kuehn, Wilmington, and John R. Wyhof, Newark, both of Del., assignors to ICI America Inc., Wilmington, Del.**

**Filed May 21, 1973, Ser. No. 362,539**

**Int. Cl. C08g *17/10***

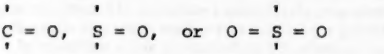
**U.S. Cl. 260—47 C** **15 Claims**

1. A dielectric resin comprising an amine salt of a polyester resin, said resin comprising the reaction product of a dicarboxylic acid or an anhydride thereof provided that at least 80 mol percent of said acid or anhydride is an alpha unsaturated dicarboxylic acid, an anhydride thereof an aromatic dicarboxylic acid or an anhydride thereof, and a polyol blend comprising a first polyol having the following formula:



wherein

R is an alkylidene group containing from one to four carbon atoms, a cycloalkylidene group containing five or six carbon atoms, oxygen, sulfur, or a radical having one of the following formulas:



*c* is 0 or 1;

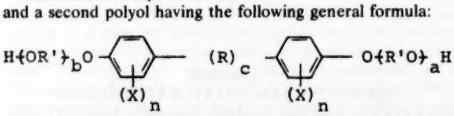
X is halogen or an alkyl radical containing from one to three carbon atoms;

*n* is an integer equal to from 0 to 4;

R′ is an alkylene group containing from two to four carbon atoms or the radical $CH_2CHO$; and

*a* and *b* are integers each of which is equal to at least 1 and the sum of which is equal to about 2, provided that the sum must be equal to at least 2.0

and a second polyol having the following general formula:



wherein

R, *c*, X, R′, and *n* are as defined above and *a* and *b* are integers each of which is equal to at least 1 and the sum of which is equal to from about 9 to about 16,

wherein the amount of acid or anhydride employed is sufficient to introduce from about 0.8 to about 1.2 carboxyl groups per hydroxyl group in the polyol blend and the amine has a boiling point of less than about 100°C.

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**3,865,870**

## OXIDATION OF METHYLATED BENZENES

**Donald C. Cronauer, Gibsonia, Pa., and Larry G. Baumgard, Belpre, Ohio, assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Mar. 14, 1973, Ser. No. 341,010**

**Int. Cl. C07c *63/02***

**U.S. Cl. 260—524 R** **6 Claims**

1. A method for the preparation of aryl carboxylic acids by the catalytic oxidation of methylated benzenes comprising contacting a mixture of water and a methylated benzene in a weight ratio of from 3:1 to 30:1 respectively, and an oxygen-containing gas with a noble metal catalyst selected from the group silver, palladium, ruthenium, platinum, rhodium, iridium, and osmium, at an elevated temperature under a pressure sufficient to maintain said mixture in the liquid phase.

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**3,865,871**

## PROCESS FOR PRODUCING AROMATIC TETRACARBOXYLIC ACIDS AND ANHYDRIDES THEREOF

**Toshio Horie; Kazuaki Yoshida; Hisako Hori, and Yoshihisa Katsuyama, all of Yokohama, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 5, 1971, Ser. No. 121,529**

**Claims priority, application Japan, Mar. 13, 1970, 45-21317; Mar. 14, 1970, 45-21630; Apr. 4, 1970, 45-28931; Oct. 26, 1970, 45-94086; Nov. 5, 0170, 45-97377; Dec. 10, 1970, 45-109752**

**Int. Cl. C07c *63/02***

**U.S. Cl. 260—524 R** **24 Claims**

1. A process for producing a high-purity aromatic tetracarboxylic acid or the anhydride thereof, which comprises oxidizing a raw material of a tetraalkylbenzene or a derivative thereof selected from the group consisting of those wherein the alkyl groups contain chlorine or oxygen or are partly oxidized to the aldehyde, ketone or acid, by means of molecular oxygen or a gas containing molecular oxygen in a medium of a monocarboxylic acid having 2 to 8 carbon atoms per molecule and in the presence of a catalyst containing 10 to 15 parts by weight of bromine and 3 to 10 parts by weight of one or more heavy metals selected from the group consisting of Co, Mn, Ce, Ni, Cr, V, Mo and W per 100 parts by weight of the tetraalkylbenzene, and purifying the resultant oxidation product by treating the product with an aqueous solution of a strong acid.

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**3,865,872**

## PROCESS FOR THE MANUFACTURE OF SORBIC ACID

**Hans Ferholz, Fischbach/Taunus; Hans-Joachim Schmidt, Falkenstein/Taunus, and Friedrich Wunder, Florsheim/-Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt Main, Germany**

**Filed Jan. 24, 1973, Ser. No. 326,385**

**Claims priority, application Germany, Jan. 27, 1972, 2203712; Apr. 12, 1972, 2217529**

**Int. Cl. C07c *51/00***

**U.S. Cl. 260—526 N** **11 Claims**

1. A process for the manufacture of sorbic acid from ketene and crotonic aldehyde by splitting a polyester formed therefrom, which comprises splitting the polyester at a temperature in the range of 20°–120°C. in the presence of an acid macroreticulated exchange resin having an average pore diameter of at least 200 A and a water content of less than 20 percent by weight.

3,865,873

## PROCESS FOR PREPARING ACRYLIC ACID AND OR METHACRYLIC ACID FROM ACROLEIN OR METHACROLEIN

Yoshio Oda; Keiichi Uchida, and Takeshi Morimoto, all of Yokohama, Japan, assignors to Asahi Glass Co., Inc., Tokyo, Japan

Filed Oct. 20, 1972, Ser. No. 299,383

Claims priority, application Japan, Oct. 22, 1971, 46-83343; Dec. 16, 1971, 46-101456; Mar. 7, 1972, 47-22756; Mar. 7, 1972, 47-22757

Int. Cl. C07c *57/04*

U.S. Cl. 260—530 N 7 Claims

1. A process for preparing acrylic acid or methacrylic acid which comprises reacting acrolein or methacrolein with molecular oxygen in vapor phase at a temperature of from 250° to 450°C, in the presence of a catalyst consisting essentially of (a) molybdenum, (b) phosphorus, (c) at least one element selected from the group consisting of niobium, tantalum and titanium, and (d) oxygen.

3. A process for preparing acrylic acid or methacrylic acid which comprises reacting acrolein or methacrolein with molecular oxygen in vapor phase at a temperature of from about 250° to about 450°C, in the presence of a catalyst consisting essentially of (a) molybdenum (b) phosphorus, (c) at least one element selected from the group consisting of niobium, tantalum and titanium, (d) oxygen and (e) a member selected from the group consisting of tin, magnesium, tungsten, tin and magnesium, tin and tungsten, iron and tungsten, and magnesium and nickel.

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3,865,874

## ALIPHATIC 2-4 DIENSIC ACIDS

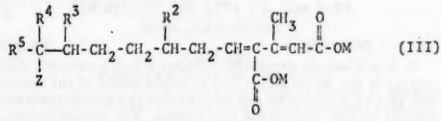
Clive A. Henrick, Palo Alto, Calif., assignor to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 340,509, March 12, 1973, , and a continuation-in-part of Ser. No. 278,328, Aug. 7, 1972, Pat. No. 3,773,793. This application Dec. 6, 1973, Ser. No. 421,433

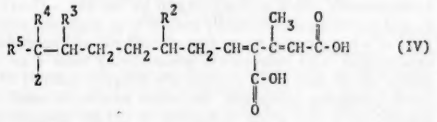
Int. Cl. C07c *59/18*

U.S. Cl. 260—535 P 7 Claims

1. A compound selected from the following formulas



(III)



(IV)

wherein,

M is potassium or sodium;

each of $R^2$, $R^4$ and $R^5$ is methyl or ethyl;

$R^3$ is hydrogen or methyl; and

Z is hydrogen, hydroxy or lower alkoxy.

3,865,875

## METHOD OF PURIFYING SECONDARY AMMONIUM N,N-DISUBSTITUTED THIOLCARBAMATES

Colin John Hearsey, Surbiton/Surrey, and Brahm Dev Mehta, London, both of England, assignors to Quimco GmbH, Zuerich, Switzerland

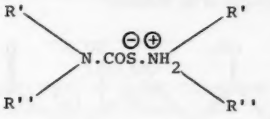
Filed Dec. 6, 1972, Ser. No. 312,750

Claims priority, application Great Britain, Dec. 6, 1971, 56580/71

Int. Cl. C07d *31/48*

U.S. Cl. 260—553 R 4 Claims

1. A method of purifying secondary ammonium N,N-disubstituted thiolcarbamates of the general formula:



in which R′ and R″, which may be the same or different, are alkyl radicals having 1 to 4 carbon atoms or alkenyl radicals having 3 or 4 carbon atoms wherein a solution of a secondary ammonium N,N-disubstituted thiolcarbamate of the above-given general formula in a solvent therefor, which solution also contains impurities, is heated to distill the said thiolcarbamate and solvent from the impurities to give a distillate containing the desired thiolcarbamate in the solvent and free from the said impurities.

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3,865,876

## SYNTHESIS OF 3,3′-DIAMINOBENZIDINE FROM 3,3′-DICHLOROBENZIDINE

Edward C. Chenevey, North Plainfield; Melvin L. Druin, West Orange, both of N.J., and Kenneth Oringer, Westport, Conn., assignors to Celanese Corporation, New York, N.Y.

Filed Oct. 21, 1969, Ser. No. 868,200

Int. Cl. C07c *85/02*

U.S. Cl. 260—581 9 Claims

1. A process for the synthesis of 3,3′-diaminobenzidene from 3,3′-dichlorobenzidine consisting essentially of reacting 3,3′-dichlorobenzidine with $NH_3$ in the presence of water and a catalyst consisting essentially of cuprous chloride.

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3,865,877

## PROCESS FOR THE DISPROPORTIONATION OF DIALLYLAMINES

Hans-Jurgen Arpe, Fischbach, Taunus, and Hansjorg Hey, Langenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt Main, Germany

Filed Apr. 26, 1973, Ser. No. 354,850

Claims priority, application Germany, Apr. 29, 1972, 2221253

Int. Cl. C07c *85/00*

U.S. Cl. 260—583 H 4 Claims

1. A process for the disproportion of the diallylamines of the formula I

$$(R^1H\,C{=}CR^2{-}CH_2)_2NH \qquad (I)$$

where $R^1$ and $R_2$ each are hydrogen, lower alkyl or alkenyl having up to 5 carbon atoms to the corresponding mono- and triallylamines of the formulae II and III

$$R^1HC{=}CR^2{-}CH_2NH_2 \qquad (II)$$

$$(R^1HC{=}CR^2{-}CH_2)_3N \qquad (III)$$

where $R^1$ and $R^2$ are as defined above, which comprises reacting the diallylamines in the presence of from 0.1 to 5 mole percent of said diallylamines of a catalyst system containing (1) a compound or a complex of palladium and (2) triphenyl phosphine or tributyl phosphine, the molar ratio of phospho-

rus to palladium in said catalyst system being from 2:1 to 1000:1.

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**3,865,878**

## UNSATURATED SULPHONES

**Pierre Chabardes, Lyon; Marc Julia, Paris, and Albert Menet, La Mulatiere, all of France, assignors to Rhone-Poulenc S.A., Paris, France**

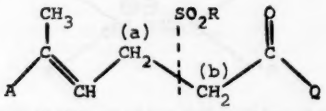
**Filed Feb. 1, 1973, Ser. No. 328,597**

**Claims priority, application France, Feb. 4, 1972, 72.03806; Apr. 10, 1972, 72.12480**

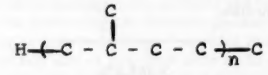
**Int. Cl. C07c** *49/76, 47/82*

**U.S. Cl. 260—590** **14 Claims**

1. A sulphone of the formula:



in which the sulphonyl group replaces a hydrogen atom on carbon atom (a) or (b), R is an alkylaryl or aryl hydrocarbon radical, Q is an alkyl, alkenyl, or aromatic hydrocarbon radical, and A represents (a) a hydrocarbon radical having a carbon skeleton of formula:



wherein *n* is 1 to 8, each $C_5$ unit containing 0–2 ethylenic double bonds, the remaining valencies being satisfied by hydrogen atoms or two adjacent $C_5$ units are joined to form a structure containing a ring of 6 ring carbon atoms, (b) a methyl radical which is unsubstituted or substituted by halogen or a sulphide or sulphone group, or (c) a primary alcohol group $-CH_2OH$ or alkyl ether thereof with 2 to 7 carbon atoms.

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**3,865,879**

## PROCESS FOR THE PREPARATION OF PERI-INDENONES

**Kurt Eiglmeier, Rosdert, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Main, Germany**

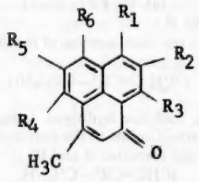
**Filed Feb. 26, 1973, Ser. No. 336,006**

**Claims priority, application Germany, Mar. 1, 1972, 2209692; Dec. 22, 1972, 2262857; Dec. 22, 1972, 2262858**

**Int. Cl. C07c** *49/76, 49/80, 49/82*

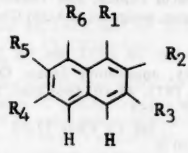
**U.S. Cl. 260—590** **12 Claims**

1. Process for the preparation of carbocyclic indenones of the formula (1)



(1)

where $R_1$ through $R_6$ each are hydrogen, fluorine, chlorine, nitro, trifluoromethyl, alkyl or alkoxy, said alkyl and alkoxy radicals having from 1 to 4 carbon atoms, two adjacent radicals $R_1$ through $R_6$ may together form a single or multiple carbocyclic aromatic ring, two or more radicals $R_1$ through $R_6$ may together form a carbocyclic aromatic system, and the radicals $R_1$ and $R_6$ may together form $-CH_2-CH_2-$, which comprises reacting carbocyclic aromatic compounds having a free peri-group and corresponding to the formula (2)



(2)

where $R_1$ through $R_6$ are as defined above, with acetoacetyl fluoride in at least 90 % hydrofluoric acid at temperatures of from −10° to +120°C.

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**3,865,880**

## DECOLORIZATION OF KETONES

**Joseph R. Quelly, Berkeley Heights, and Thomas P. McNamara, Atlantic Highlands, both of N.J., assignors to Exxon Research and Engineering Company, Lenelen, N.J.**

**Filed Sept. 9, 1971, Ser. No. 179,187**

**Int. Cl. C07c** *49/06, 49/10*

**U.S. Cl. 260—593 P** **8 Claims**

1. A method for decolorizing off-color ketone streams containing alkanones having from 3–12 carbon atoms and containing color causing impurities comprising diketone color bodies, which method comprises passing said streams through a bed comprising in admixture as alkali metal borohydride and a filter material selected from the group consisting of attapulgus clay, crushed firebrick, diatomaceous earth and mixtures thereof wherein the amount of alkali metal borohydride is in the range of from about 1–20 percent by weight based on the amount of filter material present in admixture and at a temperature in the range of from 15°–30°C and a feed rate of from about 300–500 lbs./hr. based on the amount of alkali metal borohydride employed, said feed rate providing a contact time of from 1–30 minutes for said streams with said bed, and thereafter recovering a substantially water-white ketone containing stream.

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**3,865,881**

## PREPARATION OF KETONES

**Charles H. McMullen, Scarsdale, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 22, 1972, Ser. No. 236,997**

**Int. Cl. C07c** *49/06*

**U.S. Cl. 260—593 R** **7 Claims**

1. A process for producing ketones which comprises reacting (i) in the liquid phase: (ii) an alpha-olefin of the formula $R^1CH=CH_2$ wherein $R^1$ represents hydrogen or alkyl of 1 to 18 carbon atoms, with an alkanal of from 2 to 8 carbon atoms; (iii) in the presence of an initiating amount of an organic hydroperoxide which is characterized by the unit —O—O—H, said unit being monovalently bonded to an aliphatic carbon atom of a hydrocarbyl group free of ethylenic and acetylenic unsaturation, said hydrocarbyl group having from 4 to 12 carbon atoms; and (iv) a catalytically effective quantity of a metal-containing compound, the metal moiety of which is selected from the group consisting of cobalt, manganese, chromium and iron, wherein the metal moiety of said metal containing compound is capable of readily undergoing a one electron redox cycle between a relatively stable plus two (+2) oxidation state and a relatively stable plus three (+3) oxidation state; (v) at an elevated temperature of from about 45°C to about 125°C; and (vi) for a period of time sufficient to produce said ketones.

## 3,865,882
## PROCESS FOR PREPARING GLYOXAL

Shigeki Horlie; Chiyuki Fujii, both of Kanagawa Pref., and Yoshio Kosai, Tokyo, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1970, Ser. No. 35,944
Claims priority, application Japan, May 9, 1969, 44-35308
Int. Cl. C07c 47/12
U.S. Cl. 260—601 R 24 Claims

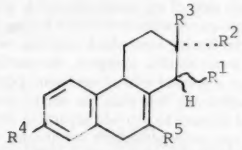
1. A process for preparing glyoxal which comprises in the presence of water reacting chloroacetaldehyde with a dialkyl sulfoxide, each of said alkyl groups, which may be the same or different, of said dialkyl sulfoxide having less than 5 carbon atoms, at a temperature of at least 20°C.

## 3,865,883
## 1,2,3,4,9,12-HEXAHYDROPHENANTHRENES

John A. Edwards, Los Altos, and John H. Fried, Palo Alto, both of Calif., assignors to Syntex Corporation, Apartado, Panama, Panama

Division of Ser. No. 883,582, Dec. 9, 1969, Pat. No. 3,681,427. This application Mar. 17, 1972, Ser. No. 235,808
Int. Cl. C07c 171/07
U.S. Cl. 260—613 R 8 Claims

1. A compound selected from the group of compounds represented by the following formula:



wherein

$R^1$ is methyl or ethyl:

$R^2$ is hydroxymethyl or the hydrolyzable hydrocarbon carboxylic acid esters thereof wherein the carboxylic acid moiety has from 2 to 14 carbon atoms;

$R^3$ is methyl or ethyl;

$R^4$ is lower alkyloxy wherein the alkyl moiety has from 1 to 6 carbon atoms, hydroxy, the hydrolyzable hydrocarbon carboxylic acid esters of said hydroxy group wherein the carboxylic acid moiety has from 2 to 14 carbon atoms, tetrahydropyran-2′-yloxy, tetrahydrofuran-2′-yloxy, 4′-methoxytetrahydropyran-2′-yloxy, or cyclopentyloxy; and

$R^5$ is hydrogen or methyl.

## 3,865,884
## PREPARATION OF ORCINOL

Robert G. Agusto; Francis A. Taylor, and Hartwell L. Briggs, all of Chicago, Ill., assignors to Canadian Thermo Images, Ltd., Vancouver, British Columbia, Canada

Filed May 11, 1970, Ser. No. 36,419
Int. Cl. C07c 37/06
U.S. Cl. 260—621 H 9 Claims

1. A process for preparing 3,5-dihydroxytoluene which comprises: condensing an alkyl crotonate with an alkyl acetoacetate, said alkyl groups containing from 1–12 carbon atoms, in the presence of a strong base selected from the group consisting of sodium hydride, sodium methylate and sodium ethylate to form the salt of a carboalkoxymethyldihydroresorcinol; refluxing said salt with an aqueous alkali metal hydroxide solution, recovering the hydrolysis product, heating said hydrolysis product in the presence of acid, cooling to form a precipitate, recovering said precipitate which is methyldihydroresorcinol; and subsequently dehydrogenating said methyldihydroresorcinol to form orcinol.

## 3,865,885
## CATALYTIC CHLOROFLUORINATION OF ISOPROPYL FLUORIDE TO 1,1,2-TRICHLOROTRIFLUOROPROPENE-1

John MacMillan Bruce, Jr., Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

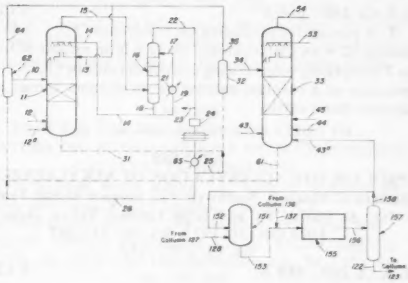
Filed Aug. 10, 1973, Ser. No. 387,477
Int. Cl. C07c 17/06, 17/34, 21/18
U.S. Cl. 260—653.3 5 Claims

1. In a catalyzed reaction at a temperature of between 300°C. and 500°C. of isopropyl fluoride with hydrogen fluoride and chlorine to form 1,1,2-trichlorotrifluoropropene-1, the improvement comprising employing a catalyst combination of a divalent cobalt compound and activated amorphous carbon.

## 3,865,886
## PRODUCTION OF ALLYL CHLORIDE

Harvey D. Schindler, Paterson; Morgan C. Sze, Upper Montclair, and Herbert Riegel, Maplewood, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed June 20, 1973, Ser. No. 371,615
Int. Cl. C07c 21/04
U.S. Cl. 260—654 R 18 Claims



1. A process for producing allyl chloride, comprising:

a. contacting in a first reaction zone propane and a member selected from the group consisting of chlorine, hydrogen chloride and mixtures thereof with a molten mixture comprising the higher and lower valent chlorides of a multivalent metal and the oxychloride of the metal to produce a first effluent comprising allyl chloride, isomers of allyl chloride, and dichloropropane;

b. recovering dichloropropane and isomers of allyl chloride from the first effluent;

c. introducing isomers of allyl chloride recovered from the first effluent into a second reaction zone wherein the isomers are hydrochlorinated to dichloropropane by contact with hydrogen chloride;

d. dehydrochlorinating in a third reaction zone dichloropropane produced in the second reaction zone and dichloropropane recovered from the first effluent to produce a second effluent comprising allyl chloride, hydrogen chloride and isomers of allyl chloride;

e. recovering hydrogen chloride and isomers of allyl chloride from the second effluent;

f. recycling hydrogen chloride recovered from the second effluent to at least one of the first and second reaction zones;

g. recovering allyl chloride from the first and second effluents as product; and

h. recycling isomers of allyl chloride recovered from the second effluent to step (c).

## 3,865,887
## PROCESS FOR REMOVING LOWER ALKYL CHLORIDES FROM VINYL CHLORIDE MONOMERS

**Ronnie D. Gordon, Richardson, Tex., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed June 21, 1972, Ser. No. 265,073**
**Int. Cl. C07c** *21/02*
**U.S. Cl. 260—656 R** **7 Claims**

1. A process for purifying crude vinyl chloride containing lower alkyl chloride derived from pyrolysis of 1,2-dichloroethane which comprises removing said lower alkyl chloride by passing said crude vinyl chloride at elevated temperatures in the range of about 75°C to about 300°C through a bed of a purification agent selected from the group consisting of metal oxides supported on alumina wherein the metal is a Group IVB, VB, VIB, VIIB or VIII metal; bismuth oxide supported on alumina; copper sulfate supported on alumina; cobalt chloride supported on alumina; thorium oxide supported on alumina; magnesium oxide; and alumina.

## 3,865,888
## PROCESS FOR PRODUCING CYCLOALKENES

**Susumu Akutagawa, Tokyo; Hidenori Kumobayashi, Kanagawa, and Akira Komatsu, Tokyo, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan**

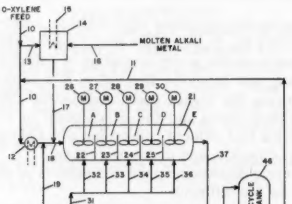
**Filed June 24, 1974, Ser. No. 482,696**
**Claims priority, application Japan, Aug. 2, 1973, 48-87013**
**Int. Cl. C07c** *13/00*
**U.S. Cl. 260—666 A** **9 Claims**

1. A process for producing cyclopolyenes (1,5, . . . $4n + 5$) having $12 + 4n$ carbon atoms where n is an integer of from 1 to 7 comprising polymerizing cyclododecatriene (1,5,9) in the presence of a rhenium catalyst on an alumina carrier or an alumina-boria carrier.

## 3,865,889
## PROCESS FOR ALKENYLATION OF ALKYLBENZENES

**Richard E. Mitchell, Boothwyn, Pa., assignor to Sun Ventures Inc., St. Davids, Pa. and Teijin Limited, Tokyo, Japan**

**Filed Oct. 31, 1973, Ser. No. 411,563**
**Int. Cl. C07c** *3/52*
**U.S. Cl. 260—668 B** **8 Claims**




1. In a process in which an alkadiene is reacted with excess alkylbenzene including recycle alkylbenzene hereinafter specified to form a reaction mass containing the mono-adduct alkadiene-alkylbenzene addition product, the reaction mass is fractionated in a distillation column to separate a relatively pure mono-adduct and alkylbenzene, the latter being employed as said recycle, the improvement which comprises:

a. introducing the reaction mass to a flash chamber to separate a portion of the alkylbenzene therein;

b. fractionating the remaining reaction mass in said distillation column to separate relatively pure monoadduct and additional alkylbenzene;

c. and employing alkylbenzene separated in both the flash chamber and the distillation column as said recycle.

## 3,865,890
## PROCESS FOR SEPARATING A MATERIAL FROM A MIXTURE OF MIXTURE WHICH COMPRISES EMPLOYING A SOLID WATER-INSOLUBLE, HYDROPHILIC, SEMI PERMEABLE MEMBRANE

**Edward F. Steigelmann, and Robert D. Hughes, both of, Park Forest, Ill., assignors to Standard Oil Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 335,012, Feb. 23, 1973. This application May 30, 1973, Ser. No. 365,203**
**Int. Cl. B01d** *53/23;* **C07c** *11/00*
**U.S. Cl. 55—16** **8 Claims**

1. In a method for separating a material from a mixture which comprises contacting said mixture containing said material with a first side of an essentially solid, water-insoluble, hydrophilic, semi-permeable membrane having therein aqueous liquid barrier having ions which combine with said material to form a water-soluble complex, the partial pressure of said material on a second side of said semi-permeable membrane being sufficiently less than the partial pressure of said material in said mixture to provide separated material on said second side of said semi-permeable membrane, and removing said separated material from the vicinity of said second side of said semi-permeable membrane, said separted material having a transfer rate across said liquid barrier that is greater than at least one other component of said mixture, the improvement which comprises employing as said semi-permeable membrane a semi-permeable grafted copolymer film consisting essentially of nylon having grafted thereto a polymer of an alpha-olefinic, hydrophilic, polymerizable monomer.

## 3,865,891
## METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION

**Viktor Sergeevich Smirnov, Kutuzovsky prospekt, 26, kv. 555; Vladimir Mikhailovich Gryaznov, Leninskie Gory, MGU, Zona L, kv. 110; Valentina Ivanovna Lebedeva, Leninsky prospekt, 48a, kv. 29; Alexandr Petrovich Mischenko, Khersonskaya ulitsa, 7, korpus 4, kv. 115; Victoria Petrovna Polyakova, ulitsa Trofimova, 15, kv. 201, and Evgeny Mikhailovich Savitsky, ulitsa Dm. Ulyanova, DNR-3, kv. 13, all of Moscow, U.S.S.R.**

**Division of Ser. No. 23,037, March 26, 1970, abandoned. This application July 12, 1972, Ser. No. 271,186**
**Int. Cl. C07c** *11/12*
**U.S. Cl. 260—680 R** **13 Claims**

1. A method for the selective preparation of dienes which comprises the passing of a vaporized hydrocarbon feedstock at a temperature of 300° to 650°C over a catalyst consisting of palladium alloyed with at least one member of the group consisting of rhenium, tungsten, and a combination of tungsten and ruthenium, the content of palladium in said alloy ranging from 60 to 99 weight percent, said feed-stock being a $C_2$—$C_{20}$ olefin which is thereby subjected to dehydrogenation.

## 3,865,892
## HOMOGENEOUS DISPROPORTIONATION-DIMERIZATION OF OLEFINS

Ernest A. Zuech, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 849,181, Aug. 11, 1969, abandoned. This application Apr. 17, 1972, Ser. No. 244,855
Int. Cl. C07c 3/10, 3/62
U.S. Cl. 260—683 D 10 Claims

1. A method of converting acyclic monoolefins having from 3–12 carbon atoms per molecule to higher molecular weight olefins which comprises contacting the acyclic monoolefin with a catalyst system of a homogeneous olefin disproportionation component

a. an NO containing molybdenum complex a homogeneous olefin dimerization component

b. a complex of nickel represented by the formula $(R_3P)_2NiX_2$, $(L_1)_2NiX_2$, $(L_4)NiX_2$, or $(L_5)_2Ni$ wherein R is an aromatic or saturated aliphatic radical, or an aromatic or saturated aliphatic radical substituted with halo groups or alkoxy groups, $(L_1)$ is $R_3PO$, unsubstituted or R-substituted pyridine, or unsubstituted or R-substituted pyridine oxide, and X is chlorine, bromine or iodine, $(L_4)$ is unsubstituted or R-substituted 2,2′-bipyridines, $(L_5)$ is unsubstituted or R-substituted picolinate radicals, and the total number of carbon atoms in the complex does not exceed about 60; and a third component

c. an organoaluminum halide represented by the formula $R_xAlX_y$ wherein $x$ and $y$ are integers of at least 1 whose total is 3, R is as defined above, and X is chlorine, bromine or iodine.

## 3,865,893
## CONVERSION PROCESS UTILIZING HOMOGENEOUS METAL CATALYSTS

Judith G. Thatcher, and Rudolph C. White, both of c/o Texaco Inc., P.O. Box 3407, Richmond, Va. 23234

Continuation of Ser. No. 76,993, Sept. 30, 1970, abandoned. This application Nov. 30, 1972, Ser. No. 310,746
Int. Cl. C07c 5/02, 5/24
U.S. Cl. 260—683.2 3 Claims

1. A process for isomerizing alpha ($\alpha$) olefins containing at least 4 carbon atoms to their isomerized internal olefinic products, comprising contacting each mole of said olefins to be isomerized to olefinic products with about 0.01 to about 0.1 moles of homogeneous cobalt catalytic complex consisting essentially of:

$$HCoN_2[(C_6H_5)_3P]_3$$

at temperatures ranging between about 0°C. and about 60°C. at pressures ranging from about 0 psig to about 600 psig, in a solubilizing amount of non-aqueous, inert solvent media in an inert atmosphere substantially free from carbon monoxide and oxygen, said atmosphere being selected from the group of gases consisting of nitrogen, the noble gases and mixtures thereof, until the desired, isomerized internal olefinic products are formed.

3. A process for hydrogenating olefinic substrates selected from the group consisting of alpha olefins, internal olefins, linear dienes and cyclodienes containing at least 4 carbon atoms to produce their desired and corresponding saturated alkanes, comprising contacting each mole of said olefinic substrates to be hydrogenated with about 0.01 moles to 0.1 moles of homogeneous cobalt complex catalyst consisting essentially of:

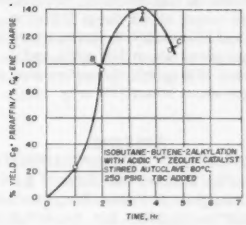
$$H_3Co[(C_6H_5)_3P]_3$$

at temperatures ranging from about 20°C. to about 35°C., at pressures ranging from about atmospheric to about 600 psig, in a solubilizing quantity of inert, non-aqueous solvent media in a hydrogen environment substantially free from carbon monoxide and oxygen, until the desired saturated alkanes are formed.

## 3,865,894
## PROCESS FOR PARAFFIN-OLEFIN ALKYLATION

Francis William Kirsch, Wayne; David S. Barmby, Media, and John D. Potts, Springfield, all of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 581,129, Aug. 25, 1966, abandoned. This application Mar. 26, 1968, Ser. No. 716,190
Int. Cl. C07c 3/52
U.S. Cl. 260—683.43 8 Claims

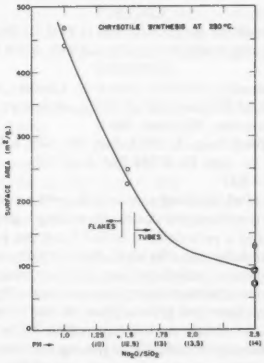

% YIELD C5+ PARAFFIN/% C4-ENE CHARGE
ISOBUTANE-BUTENE-2 ALKYLATION WITH ACIDIC "Y" ZEOLITE CATALYST STIRRED AUTOCLAVE 80°C, 250 PSIG. TBC ADDED
TIME, Hr

1. A paraffin-olefin alkylation process which comprises contacting monoolefin of the $C_2$-$C_9$ range in admixture with paraffin of the $C_4$-$C_6$ range and with a substantially anhydrous acidic crystalline alumino-silicate zeolite under alkylating conditions and wherein there is present in solution in the reaction mixture from $10^{-5}$ to $10^{-1}$ mole per mole of $C_4$-$C_6$ paraffin of a halide, said halide being selected from the group consisting of HCl, carbon tetrachloride and the aliphatic saturated monochlorides having no more than 6 carbon atoms.

## 3,865,895
## PROCESS FOR THE HYDROGENATION OF UNSATURATED HYDROCARBONS WITH CHRYSOTILE CATALYST COMPOSITIONS

Harry E. Robson, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 233,368, March 9, 1972, Pat. No. 3,804,741, which is a division of Ser. No. 63,324, Aug. 31, 1970, Pat. No. 3,729,429. This application Aug. 24, 1973, Ser. No. 391,354
Int. Cl. C10g 23/02; C07c 5/14
U.S. Cl. 260—683.9 31 Claims




1. A process for the hydrogenation of unsaturated hydrocarbons comprising contacting said unsaturated hydrocarbons, with hydrogen, at temperatures ranging from about 50°C. to about 450°C., and pressures ranging from about 100 psi to about 300 psi, with a catalyst comprising a chrysotile composition characterized as having repeating units defined by the following structural formula:

$$[(1-x)\,M^{(a)} + xM^{(b)}]_n(OH)_4Si_2O_5 \cdot wH_2O$$

where $M$ and $M$ are selected from monavalent and multivalent metal cations selected from Groups I, II, III, IVB, VB, VIB, VIIB, and VIII metals, of the Periodic Table of the Elements, having an effective ionic radius ranging from about 0.5 to about 1 A, $x$ is a number ranging from 0 to 1 which expresses the atomic fraction of the metals M and M, $a$ is the valence of M, $b$ is the valence of M, $n$ is a number equal in value to that defined by the ratio $6/[a(1-x)+bx]$, $w$ is a number ranging from 0 to 4, and

where $x = 0$, and M is magnesium, the surface area of the composition ranges above about 110 $m^2/g$,

where $x = 0$, and M is nickel, the surface area of the composition ranges above about 125 $m^2/g$, and

where $x = 0$, and M is cobalt, the surface area of the composition ranges above about 190 $m^2/g$.

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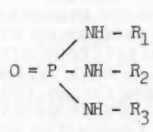
## 3,865,896
## ALKYLATION CATALYST ADDITIVE

**Frederic C. McCoy, Beacon, and Edward L. Cole, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Nov. 5, 1973, Ser. No. 413,123**
**Int. Cl. C07c** *3/54*
**U.S. Cl. 260—683.51** **10 Claims**

1. In an alkylation process wherein an isoparafin hydrocarbon is alkylated with an olefin in the liquid phase with an alkylation catalyst selected from the group consisting of hydrogen fluoride, sulfuric acid, fluorosulfonic acid, mixtures of sulfuric acid and fluorosulfonic acid, and aluminum chloride, the improvement which comprises:

employing, in said alkylation process, from about 0.0005 to about 0.5 weight percent based on said liquid alkylation catalyst a compound having the chemical formula



wherein $R_1$, $R_2$ and $R_3$ are selected from the straight chain and branched chain alkyl radicals having from 10 to 24 carbon atoms each.

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## 3,865,897
## METHOD OF BLENDING POLYOLEFINS AND POLYDIORGANOSILOXANE GUMS AND BLENDS THEREOF

**James R. Falender, Sanford; Sarah E. Lindsey, and John C. Saam, both of Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Aug. 3, 1973, Ser. No. 385,360**
**Int. Cl. C08f** *29/12, 35/02*
**U.S. Cl. 260—827** **9 Claims**

1. A method of blending a polyolefin and a polydiorganosiloxane gum comprising mechanically mixing a polydiorganosiloxane gum and a polyolefin selected from the group consisting of low density polyethylene, high density polyethylene, polymethylpentene, polypropylene and a copolymer consisting of tetrafluoroethylene repeating units and ethylene repeating units, at a shear rate greater than 10 $sec^{-1}$ for a period of time suitable to obtain a viscosity within 60 percent of the maximum viscosity obtainable at mixing conditions, and at a temperature within a range for each polyolefin of from 175° to 300°C. for low density polyethylene, from 200° to 320°C. for high density polyethylene, from 225° to 300°C. for polymethylpentene, from 215° to 300°C. for polypropylene and from 275° to 350°C. for copolymers of tetrafluoroethylene repeating units and ethylene repeating units and thereafter recovering a processable stable, homogeneous blend, said polydiorganosiloxane gum being present in an amount of from 7 to 75 weight percent and said polyolefin being present in an amount of from 25 to 93 weight percent wherein the combined weight of the polydiorganosiloxane gum and polyolefin is 100 weight percent, said polydiorganosiloxane gum being a toluene soluble gum having a Williams plasticity greater than 0.020 inch, with a ratio of organic groups per silicon atom of about two wherein the organic groups are selected from methyl, phenyl, vinyl and allyl with from 1.5 to 17 mol percent of the siloxane units having vinyl or allyl groups and no more than 50 percent of the organic groups being phenyl.

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## 3,865,898
## PROCESS FOR PREPARING BLOCK COPOLYMERS WITH CARBAMATE LINKAGES BETWEEN A POLYVINYL CHAIN AND A POLYMER HAVING ACTIVE HYDROGENS

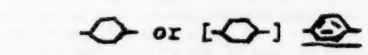
**Arthur V. Tobolsky, deceased, late of 191 Snowden Ln., Princeton, N.J. 08540 (by Dorothy E. Tobolsky, executrix)**

**Filed Feb. 26, 1973, Ser. No. 335,560**
**Int. Cl. C08g** *41/04*
**U.S. Cl. 260—859 R** **28 Claims**

1. A method for preparing a block copolymer, comprising the steps of

a. reacting a polymer constituent with bis(4-isocyanatocyclohexyl) methane at a temperature ranging between about 50° and about 80°C, thereby to form an isocyanate-capped prepolymer;

b. reacting at a temperature up to about 50°C said isocyanate-capped prepolymer with a dihydroperoxide of the formula $HOOC(CH_3)_2—_R—C(CH_2)_3OOH$ wherein R is



to form a peroxycarbamate having a peroxygen content ranging between about 0.01 and 1 percent by weight and being capable of initiating the polymerization of an ethylenically-unsaturated monomer, the mole ratio of said bis(4-isocyanatocycohexyl) methane to the —OH and —O—OH in said polymer constituent and said dihydroperoxide being about one to one;

c. adding said peroxycarbamate to an ethylenically unsaturated monomer in a liquid medium, the weight ratio of said prepolymer in said peroxycarbamate to said monomer ranging between about 5 to 95 and about 90 to 10 and the amount of said bis(4-iso-cyanatocyclohexyl) methane on said monomer ranging between about 0.01 and about 5 percent by weight; and

d. heating the mixture from step (c) at a temperature between about 60° and about 100°C for a time sufficient to polymerize said monomer and form a block polymer of alternating polyurethane and polyvinyl blocks.

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## 3,865,899
## FLATTING COMPOSITIONS

**Edward R. deVries, Lebanon, N.J., assignor to Unifilm Corporation, Somerville, N.J.**

**Filed June 1, 1973, Ser. No. 365,827**
**Int. Cl. G08g** *37/16;* **C08g** *41/04*
**U.S. Cl. 260—841** **4 Claims**

1. A flatting composition which comprises

1. dispersed discrete flatting agent particles having a fine size range from about 0.02 to about 10 microns of the in situ prepared cross-linked reaction product of

a. a crystalline, thermoplastic polar nylon or polyester organic poiymer containing reactive hydrogen groups and having a softening point of from about 120°to about 240°C. which is insoluble in common coating solvents for film-forming organic binders and soluble only at elevated temperatures in strong organic solvents for said organic polymer and

b. a cross-linking agent chemically reactive with said organic polymer and containing chemically reactive isocyanate or methylol groups;

2. a solubilized compatible film-forming organic binder; and

3. an inert liquid dispersion medium comprising

c. a common coating solvent for the compatible film-forming organic binder in which said organic polymer and said cross-linked reaction product are insoluble and

d. a strong organic solvent for said organic polymer in which the organic polymer is soluble only at elevated temperatures and in which said cross-linked reaction product is insoluble.

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3,865,900

## CATIONIC DYEABLE NYLON 6 CONTAINING ALKALINE METAL SALTS OF POLY (2-METHYL-2-(1-XO-2-PROPENYL) AMINO) -1-PROPANESULFONIC ACID

**Joseph Donald DeCaprio, Hopewell; John Christopher Haylock, and Robert Allen Lofquist, both of Richmond, all of Va., assignors to Allied Chemical Corporation, New York, N.Y.**

Filed Mar. 1, 1974. Ser. No. 447,188

Int. Cl. C08g *41/04*

U.S. Cl. 260—857 UN 10 Claims

1. A fiber-forming synthetic linear polycaproamide receptive to cationic dyes, containing from about 50 to about 300 gram equivalents per $10^6$ grams of polymer, as sulfonate, of an alkaline metal salt of poly 2-methyl-2-((1-oxo-2-propenyl)amino)-1-propane-sulfonic acid .

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3,865,901

## RESINOUS COATING COMPOSITIONS HARDENABLE BY HIGH ENERGY RADIATION

**Wolfgang Klein-Doepke, Darmstadt; Wilhelm Elser, Graefenhausen; Peter Quis, and Peter Rossberg, both of Darmstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany**

Filed Jan. 4, 1973, Ser. No. 321,006

Claims priority, application Germany, Jan. 3, 1972, 2200013

Int. Cl. C08f *2/00*

U.S. Cl. 260—871 7 Claims

1. A resinous coating composition, hardenable by exposure to high-energy radiation, comprising, as the radiation-hardenable binder component thereof, a mixture of: (a) 40 to 90 percent, by weight of said binder component, of unsaturated polyester having olefinic bonds, polymerizable by free-radical polymerization, in a position $\alpha,\beta$ to an ester carbonyl group from a dicarboxylic acid; and (b) 60 to 10 percent, by weight of said binder component, of a member selected from the group consisting of (i) alkoxyalkyl esters of acrylic acid and methacrylic acid, (ii) mixtures of said esters with up to an equal amount by weight of an hydroxyalkyl ester of acrylic acid or methacrylic acid, and (iii) mixtures of (i) or (ii) with up to 20 percent, by weight of said mixtures, of at least one further, different, vinyl or vinylidene monomer.

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3,865,902

## PROCESS FOR THE POLYMERISATION OF MONO-OLEFINS

**Wolfgang Gordon, Hofheim, Taunus; Kurt Rust, Frankfurt, Main, and Erwin Schrott, Sulzbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt/Main, Germany**

Filed Apr. 10, 1973, Ser. No. 349,850

Claims priority, application Germany, Apr. 15, 1972, 2218363

Int. Cl. C08f *1/56, 1/40, 3/10*

U.S. Cl. 260—878 B 6 Claims

1. In a process for the preparation of a crystalline polyolefin by polymerization of at least one $\alpha$-olefin of the formula $CH_2{=}CH{-}R$, wherein R represents an aliphatic radical having 1 to 4 carbon atoms, in suspension, in solution or in the gas phase, at a temperature of from 20° to 130°C. and a pressure of from 1 to 50 kg/cm², wherein the polymerization is carried out with a mixed catalyst, the improvement which comprises using a mixed catalyst prepared from

a. a halogen compound of the trivalent titanium

b. a halogen free, organo-aluminum compound

c. a monocyclopolyalkene having 7 or 8 ring members and respectively 2 to 3 or 2 to 4 non-cumulated double bonds in the ring or the alkyl or alkoxy substituted derivatives thereof, the alkyl radical of the substituent containing from 1 to 4 carbon atoms and

d. a cyclic or non-cyclic compound which contains as the only functional groups one or two tertiary carboxylic acid amid groups or a urea grouping fully substituted at the nitrogen atoms.

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3,865,903

## HEAT SEALABLE ISOTACTIC POLYPROPYLENE AND 1,3 PENTADIENE POLYMER

**Michael A. Nahmias, Canandaigua, N.Y., and Edward M. Bullard, South Orange, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

Filed Apr. 16, 1973, Ser. No. 351,211

Int. Cl. C08d *3/04;* C08f *29/12*

U.S. Cl. 260—889 16 Claims

1. A resinous blend composition comprising a blend of an essentially isotactic, crystalline polypropylene containing, a minor amount, sufficient to improve the heat sealability of film prepared therefrom, of from about 5% to about 40% by weight of a normally solid, resinous, random multipolymer of a mixture comprising pentadiene 1,3 and at least one other compound containing ethylenic unsaturation copolymerizable therewith.

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3,865,904

## ADDITIVES FOR POWDER RESINS

**Frank Wingler, Leverkusen; Richard Muller, Bergisch Neukirchen, and Dieter Pollheide, Leichlingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

Filed Dec. 15, 1972, Ser. No. 315,621

Claims priority, application Germany, Dec. 22, 1971, 2163675

Int. Cl. C08f *31/18;* C08f *29/50*

U.S. Cl. 260—901 4 Claims

1. A composition comprising from 0.1 to 5% by weight of a solvent-free copolymer having an average molecular weight of from 1,000 to 10,000 and a viscosity of from 1 to 1,000 poises at 100° C., said copolymer comprising copolymerized units of:

I. from 1 to 20 parts by weight of an $\alpha,\beta$-monoolefinically unsaturated carboxylic acid having from three to five carbon atoms;

II. from 0 to 50 parts by weight of an ester of acrylic acid or methacyclic acid having from one to four carbon atoms in the alcohol radical and

III. from 30 to 99 parts by weight of an ester of acrylic or methacrylic acid having from five to 20 carbon atoms in the ester alcohol,

and from 95 to 99.9% by weight of a solvent-free copolymer, said copolymer comprising copolymerized units of:

A. from 25 to 60% by weight of styrene;

B. from 10 to 70% by weight of at least one ester of acrylic acid or methacrylic acid and

C. from 5 to 30% by weight of at least one member selected from the group consisting of a hydroxy alkyl ester of an $\alpha,\beta$-unsaturated carboxylic acid having from three to five carbon atoms and from two to eight carbon atoms in the hydroxy alkyl moiety; acrylamide; methacrylamide; an N-methylolamide of acrylic or methacrylic acid; acrylic acid; fumaric acid; maleic acid; itaconic acid; crotonic acid and methacrylic acid.

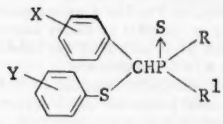
**3,865,905**

## DITHIOPHOSPHATE AND DITHIOPHOSPHONATES

**LLewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Filed Feb. 19, 1974, Ser. No. 443,543**
**Int. Cl. C07f 9/16, 9/40; A01n 9/36**
**U.S. Cl. 260—949** **3 Claims**

**1.** A compound having the formula



in which R is alkoxy having one to five carbon atoms; $R^1$ is alkyl having one to five carbon atoms; or alkoxy having one to five carbon atoms; X is hydrogen, chlorine, bromine, methyl, methoxy, or ethoxy and Y is hydrogen, chlorine, bromine, methyl, methoxy or ethoxy.

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**3,865,906**

## 0,0-DIALKYL-(3,5-DIALKYL-4-HYDROXYBENZYL)DITHIOPHOSPHATE COMPOSITIONS AND PROCESS FOR MAKING SAME

**Kju Hi Shin, Bloomfield Hills, and Edward F. Zaweski, Pleasant Ridge, both of Mich., assignors to Ethyl Corporation, Richmond, Va.**

**Division of Ser. No. 131,512, April 5, 1971, Pat. No. 3,745,148. This application Feb. 26, 1973, Ser. No. 335,446**
**Int. Cl. C07f 9/12; B01j 1/18**
**U.S. Cl. 260—953** **15 Claims**

**1.** An antioxidant composition made by the process of:

A. reacting from 1–10 moles of unsubstituted saturated monohydric alkanol containing from one to about 50 carbon atoms with a mole of $P_2S_5$ at a temperature of from about 75° to about 125°C. to form a dithiophosphate reaction mixture;

B. neutralizing said dithiophosphate reaction mixture with aqueous ammonia; and

C. adding from about 1 to 3 moles of $C_{1\text{-}20}$ alkyl-substituted hydroxybenzyl chloride to the neutralized reaction mixture and reacting at a temperature of from about 50° to 150°C. while adding aqueous ammonia at a controlled rate such that the pH is maintained in the range of about 5–6 during the reaction.

**6.** A process for making an antioxidant composition, said process comprising:

A. reacting from 1–10 moles of an unsubstituted saturated monohydric alkanol containing from one to about 50 carbon atoms with a mole of $P_2S_5$ at a temperature of from about 75° to about 125°C. to form a dithiophosphate reaction mixture;

B. neutralizing said dithiophosphate reaction mixture with aqueous ammonia; and

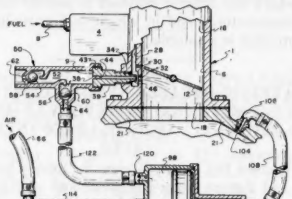
C. adding from about 1 to 3 moles of $C_{1\text{-}20}$ alkyl-substituted hydroxybenzyl chloride to the neutralized reaction mixture and reacting at a temperature of from about 50° to 150°C while neutralizing with aqueous ammonia.

**3,865,907**

## NEEDLE VALVE VAPOR INJECTION AND METHOD

**Howard P. Rock, 5034 Del Rio, Salt Lake City, Utah 84117**

**Continuation-in-part of Ser. No. 324,465, Jan. 17, 1973, abandoned, which is a continuation of Ser. No. 231,988, March 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 60,552, Aug. 3, 1970, abandoned. This application Oct. 9, 1973, Ser. No. 404,468**
**Int. Cl. F02m 25/02**
**U.S. Cl. 261—18 A** **7 Claims**



**1.** In combination:

a carburetor having a barrel communicating with an intake manifold and a fuel passage and idle port communicating fuel to the barrel, said port being in the wall of the carburetor;

a threaded bore of greater diameter than the port axially aligned with the port, the threaded bore spanning between the port and the exterior of said carburetor;

a threaded needle valve adjustably received in said threaded bore and comprising a distal end portion seatable against said wall around said port to close said port, and external means at or near the exposed proximal end of the needle valve for adjusting the spacing of said distal end from the wall, said needle valve further comprising a central axial passageway through the entire needle;

means delivering a charge of vapor comprising water through the axial passageway of the needle valve into the carburetor at predetermined engine conditions.

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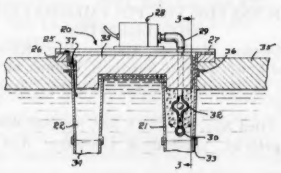
**3,865,908**

## AERATORS WITH DE-ICING MEANS

**Benedict E. Hirshon, 36 Kenwood St., Brookline, Mass.**

**Filed Jan. 15, 1974, Ser. No. 433,840**
**Int. Cl. B01f 3/04; C02c 5/04**
**U.S. Cl. 261—77** **11 Claims**



**1.** An aerator for a body of open water such as a lake, pond, river, or bay, where ice formation is to be expected, said

aerator being positionable therein and comprising depending inflow and outflow conduit portions, and a portion interconnecting the upper ends of said inflow and outflow portions in part below the surface level of the body of water and with their lower ends so disposed relative to each other as to inhibit substantial circulation therebetween, and also including wall structure extending above the water level to bar the inflow of surface water, means to effect the flow of water upwardly through the inflow portion through said interconnecting portion and downwardly through the outflow portion as a continuous stream and to aerate the circulating water before its entry into the outflow portion, said interconnecting portion being oriented to provide a time delay in the flow of the elevated water into the outflow portion to permit the escape of air therefrom, and means operable in the event the water in the interconnecting portions becomes frozen and when the first named means are in operation to effect communication within the wall structure between the space below the ice and the open air and if the ice has blocked the normal flow of water, to restore said normal flow between the inflow and outflow portions.

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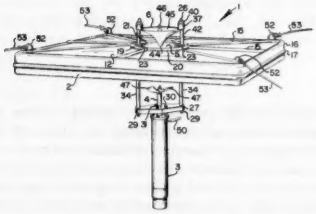
**3,865,909**

## FLOATATION AERATOR FOR AERATING AND MOVING WATER

**Roy A. Cramer, Jr., 8100 Paseo, Kansas City, Mo. 64131**

**Filed May 7, 1973, Ser. No. 358,085**
**Int. Cl. B01f** *3/04*
**U.S. Cl. 261—91** **6 Claims**



**1.** A water aeration apparatus for aerating a body of water by propelling a stream of water from said body upwardly and outwardly above the surface of said body comprising:

a. a float member of substantial area to float on a body of water and serve as a support, said float member having therethrough a central opening with a vertical axis;

b. a ring member positioned in and encasing said central opening and defining a vertical water flow passage through said float member, said ring member having laterally outward extending portions resting in supporting engagement with the float member to retain the ring member relative thereto;

c. motor support members spaced on said ring member and depending therefrom;

d. a submersible motor carried by said motor support members and spaced below said float member, said motor having a power shaft substantially axially aligned with said flow passage;

e. a propeller mounted on said power shaft between the motor and float member and spaced below the float member and ring member, the area under the float member and surrounding the propeller and motor having only the spaced motor support members therein for substantially unobstructed movement of water from below the float member to said propeller, said propeller being driven by said motor to propel a stream of water upwardly through said water passage;

f. a diffuser of generally inverted cone shape supported on said ring member above the float member and substantially axially aligned with said water passage, said diffuser having upwardly and outwardly curved surfaces for impingement of the stream of water and to disperse said water upwardly and outwardly over a wide area.

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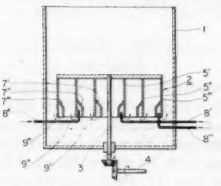
**3,865,910**

## APPARATUS AND METHOD FOR CAUSING CONTACT BETWEEN GAS AND LIQUID

**Shoichiro Hori, 8-6, 1-chome, Minami-yukigaya, Ota-ku, Tokyo, Japan**

**Filed May 17, 1972, Ser. No. 253,970**
**Claims priority, application Japan, May 20, 1971, 46-33591**
**Int. Cl. B01f** *3/04*
**U.S. Cl. 261—93** **5 Claims**



**1.** An apparatus for causing contact between gas and liquid including a vessel for containing the liquid which comprises a body vertically mounted for revolution comprising a plurality of integral hollow, concentric, coaxial cylinders of different diameters, having canopies secured to the cylindrical wall portions of the cylinders and spaced a predetermined distance therefrom, open at the lower ends and closed at the upper ends, a vertically mounted driving shaft for causing rapid revolution of said body in the liquid, and gas inlet pipes for supplying gas into spaces between said wall portions and said canopies, wherein the gas supplied to said spaces is made to encircle the outer walls of the respective spaces in the form of thin films due to the speed of revolution of said body and the gas film is then atomized into fine bubbles by means of the splitting force, so that the gas can be brought into contact with the liquid and wherein said liquid is maintained at a level which at least contacts the upper edge of the body capable of revolution.

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**3,865,911**

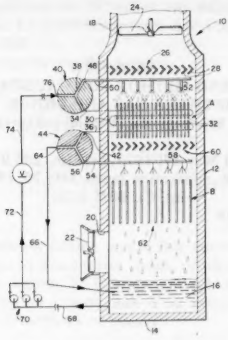
## COOLING TOWER TYPE WASTE HEAT EXTRACTION METHOD AND APPARATUS

**Marcel R. Lefevre, Bernardsville, N.J., assignor to Research-Cottrel, Inc., Bridgewater Township, N.J.**

**Filed May 3, 1973, Ser. No. 356,721**
**Int. Cl. F02m** *15/00, 29/04*
**U.S. Cl. 261—140** **12 Claims**

**1.** A hot liquid cooling tower comprising a tower housing, means for directing air through the tower housing from its lower end upwardly, a first cooling section adjacent the upper end of the tower, first liquid spray means above said first cooling section, a second cooling section adjacent the lower end of the tower, second liquid spray means between the first and second cooling sections, a cooled liquid sump at the

bottom of the tower housing, and valve means for selectively directing a source of hot liquid to be cooled to at least one of



said first and second spray means, and first and second cooling sections.

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**3,865,912**

**METHOD FOR CONTROLLING WALL THICKNESS DURING A BLOW-MOULDING OPERATION**

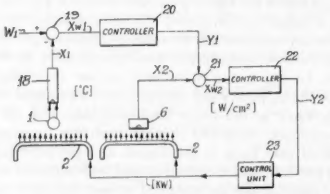
**Otto Rosenkranz, 2 Jesselallee 21e, Hamburg 73; Peter Rose, 2359 Bussardweg 10, Henstedt-Ulzburg 4, and Heinz Goos, 2 Dorotheenstr. 115, Hamburg 39, all of Germany**

**Filed Sept. 21, 1972, Ser. No. 291,022**

**Claims priority, application Germany, Oct. 13, 1971, 2151067**

**Int. Cl. B29c** *17/07*

**U.S. Cl. 264—25** **1 Claim**




1. In a method of blow moulding hollow bodies of thermoplastic materials from moulded slugs having various axial zones and of substantially uniform wall thickness wherein the slugs are heated to the requisite blow moulding temperature and expanded to the desired form in a blow moulding die, the improvement of controlling the temperature of the slugs and thereby, the wall thickness of the hollow bodies comprising the steps of:

heating the slugs in each of their various axial zones to different controlled temperatures by a plurality of infra-red radiator means, to allow differential stretching of the hollow bodies at said various axial zones as they are expanded each of said axial zones having a separate radiator means associated therewith;

measuring the radiation intensity of each infra-red radiator means by a bolometer to establish a first measured quantity for each infra-red radiator means;

utilizing any deviation of the first measured quantity for each infra-red radiator means from a first predetermined guide quantity therefor as a correcting quantity to regulate the power consumption of each associated infra-red radiator means;

measuring the temperature of the moulded slugs at each of the different axial zones by pyrometer means to establish a second measured quantity for each axial zone;

utilizing any deviation of the second measured quantity made by said pyrometer means for each axial zone from a second predetermined guide quantity therefor to regulate the first guide quantity for each associated infra-red radiator means.

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**3,865,913**

**MULTISTATION PROCESS FOR MANUFACTURING HOLLOW BODIES**

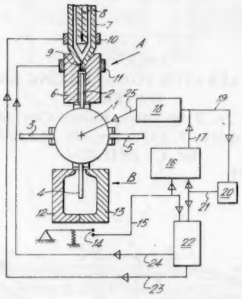
**Otto Lachner, Kempten; Ludwig Beyerlein, Lenzfried, and Klaus Spelthahn, Kempten, all of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Dec. 12, 1973, Ser. No. 424,140**

**Claims priority, application Germany, Dec. 14, 1972, 2261225**

**Int. Cl. B29c** *17/07*

**U.S. Cl. 264—40** **4 Claims**



1. A multi-station process of forming hollow articles of thermoplastic material comprising the steps of forming a preform by injecting a quantity of plasticised material through an injection nozzle into an injection mould and blow moulding the preform to the desired hollow shape in a blow mould, each of the steps being carried out during one working cycle, establishing an optimum pre-determined constant working cycle time, sensing the beginning of a working cycle, sensing the end of a working cycle as determined by the ejection of a blow moulded article from the blow mould, comparing the elapsed time for a working cycle with the pre-determined constant cycle time, and beginning a subsequent working cycle at the end of the longest time.

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**3,865,914**

**METHOD OF MAKING A COMPOSITE BODY CONSISTING OF AT LEAST TWO COMPONENT PARTS SUCH AS PROFILES**

**Helmar Nahr, 54 Nurnberger Strasse, 8530 Neustadt-Aisch, Germany**

**Division of Ser. No. 148,437, June 1, 1971, abandoned. This application Nov. 30, 1973, Ser. No. 420,685**

**Int. Cl. E04c** *3/27*

**U.S. Cl. 264—46.5 D** **3 Claims**

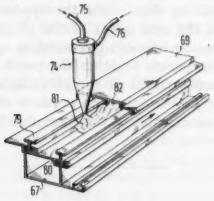
1. A method of constructing a composite frame body member including a pair of profiled elongated shaped members faced toward each other to form a laterally open cavity between them and connecting members closing the laterally open cavity and loosely securing the profiled members from moving apart from each other, comprising:

assembling one of the profiled members and the connecting members to extend at least equally in length,

placing the other profiled member in longitudinal alignment with the connecting members to receive and connect with the latter upon endwise movement of the two profiled members,

placing one of the profiled members in position to expose its interior upwardly,

introducing an expandable foam filler compound into the interior of the profiled members having its interior ex-




posed upwardly and moving the members relative to each other to assemble the profiled members and connecting members into assembled equal length, and expanding said foam filler to tension the connecting members laterally of the composite body member.

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**3,865,915**

## INJECTION MOULDING OF COMPLEX SHAPED LAMINAR ARTICLES

**Paul Johnson Garner, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 71,332, Sept. 11, 1970, abandoned. This application Jan. 15, 1973, Ser. No. 324,004**

**Claims priority, application Great Britain, Sept. 15, 1969, 45295/69**

**Int. Cl. B29d** *27/00*; **B29f** *1/00*

**U.S. Cl. 264—55** **8 Claims**

**8.** A process for the production of injection molded articles having a skin of a synthetic resinous material surrounding a core of a dissimilar synthetic resinous material at all points away from the sprue area of the molding comprising:

a. injecting a charge of a skin-forming injection moldable synthetic resinous material into a mold cavity defining the shape of the article to be molded, said cavity having at least one extension positioned at an area of the mold which is substantially filled only by the skin-forming material,

b. continuing the injection of the charge of skin-forming material to inject an amount which is insufficient to fill the mold cavity but which is in excess of that required for a substantially uniform thickness of skin on the article to be molded,

c. subsequently, but before the interior portion of the charge of skin-forming material has solidified, injecting a charge of a core-forming injection moldable foamable synthetic resinous material into the interior portion of the charge of skin-forming material,

d. continuing the injection of the charge of the core-forming material into the charge of the skin-forming material to inject an amount which extends the skin-forming material as a skin surrounding the core-forming material at all points away from the spure area of the mold cavity of fill the mold cavity, to constrain the foamable composition from foaming and to force the excess of the skin-forming material into said at least one extension so that only skin-forming material enters the at least one extension,

e. enlarging the volume of the mold cavity to allow the fomable composition to foam and extend the skin-forming material to conform a the enlarged mold cavity, and

f. removing the skin-forming material forced into said at least one extension from the skin-forming material in the mold cavity before or after demolding the molded article.

**3,865,916**

## PARTIAL COMBUSTION PROCESS SOOT PELLETS OF INCREASED STRENGTH AND THEIR PREPARATION

**Pieter Visser, and Johannes Boom, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.**

**Filed Aug. 28, 1972, Ser. No. 284,359**

**Int. Cl. B01j** *2/00*

**U.S. Cl. 264—85** **9 Claims**

**1.** A process for pelletization of soot particles suspended in water originating from a process for the manufacture of reducing gas containing carbon monoxide, hydrogen and soot by partial combustion of hydrocarbons, said soot being present in the reducing gas product in an amount which is equivalent to less than 5% of the carbon content of the hydrocarbon feed comprising:

a. setting said suspension in a turbulent motion

b. adding both a hydrocarbon binder component selected from the group consisting of a light, liquid hydrocarbon and mixtures of light liquid hydrocarbons boiling below 300° C and a pellet reinforcing additive component which is non-volatile at the conditions at which the light liquid hydrocarbon binder evaporates to the suspension in turbulent motion whereby the binder and pellet reinforcing additive spread uniformly over the soot particles in said suspension causing said soot particles to agglomerate and form pellets;

c. separating the resulting agglomerated pellets from the suspending liquid;

d. drying said agglomerated pellets and removing the hydrocarbon binder by evaporation and

e. heating under non-oxidizing conditions at a temperature of 300°–3,000° C thereby consolidating the agglomerated pellets into porous, absorbent pellets suitable as absorbent and clarifying agents.

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**3,865,917**

## PREPARATION OF ALUMINA MONOFILAMENTS

**Francis S. Galasso, Manchester, and Romeo G. Bourdeau, Wapping, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.**

**Continuation of Ser. No. 225,298, Feb. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 67,606, Aug. 27, 1970, abandoned. This application Dec. 20, 1973, Ser. No. 427,001**

**Int. Cl. D01f** *9/00*

**U.S. Cl. 264—183** **2 Claims**

**1.** A process for producing continuous aluminum chlorohydride filaments convertible by calcining to transparent gamma or alpha aluminum oxide filaments comprising:

providing an aqueous fiber-forming solution consisting essentially of 40–50 weight percent water, remainder an aluminum chlorohydroxide complex starting material having the formula $Al_2(OH)_5Cl$,

said solution having a viscosity of 1,500–3,000 centipoises; and

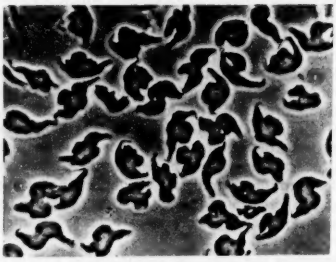
forming said viscous liquid into filaments by extruding it in a coagulating liquid consisting essentially of a liquid selected from the group consisting of isopropyl alcohol, ethyl alcohol, tertiary butyl alcohol, a mixture of ethyl alcohol and 40–70 weight percent acetone and a mixture of isopropyl alcohol and 5–25 weight percent acetone.

**3,865,918**

## WET SPINNING CELLULOSIC PRODUCTS

**Reid L. Mitchell, Morristown; Thomas E. Muller, Springfield; Hugh D. Stevens, Long Valley, and Robert S. Tabke, Parsippany, all of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Division of Ser. No. 858,573, Sept. 15, 1969, Pat. No. 3,670,069. This application Mar. 22, 1972, Ser. No. 236,993**
**Int. Cl. D01f *3/00***
**U.S. Cl. 264—188** **2 Claims**



1. A process for preparing low-cost viscose fibers having properties which are superior for nonwovens and disposables with respect to water absorption, water retention, cross-sectional shape, fiber elongation and tenacity comprising the steps of steeping dissolving grade wood pulp in a sodium hydroxide solution; pressing, shredding and aging said pulp to produce an alkali cellulose containing about 32 to 38 percent cellulose and about 14 to 16 percent sodium hydroxide and having an average degree of polymerization less than about 400; xanthating said alkali cellulose with about 25 to 30 percent carbon disulfide and dissolving the xanthate in sodium hydroxide to produce a viscose solution containing from about 7 to 12 percent cellulose and about 4 to 6 percent sodium hydroxide; ripening the solution to a salt index of about 1.5 to 7; deaerating and screening the solution; and extruding the solution into continuous filaments in a coagulating bath through a porous fiber forming device comprising a porous extrusion media containing a controlled number and distribution of discrete flow paths, said flow paths comprising at least about 10 percent of the total extrusion surface area.

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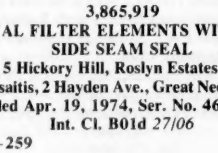
**3,865,919**

## CYLINDRICAL FILTER ELEMENTS WITH IMPROVED SIDE SEAM SEAL

**David B. Pall, 5 Hickory Hill, Roslyn Estates, N.Y. 11576, and Tadas K. Jasaitis, 2 Hayden Ave., Great Neck, N.Y. 11024**

**Filed Apr. 19, 1974, Ser. No. 462,291**
**Int. Cl. B01d *27/06***
**U.S. Cl. 264—259** **4 Claims**



1. A process for forming cylindrical filter elements of filter sheet material, which comprises forming a sheet of filter material into a substantially cylindrical shape, and bringing together end portions of the sheet in a side seam such that portions of the sheet adjacent the sheet ends have one surface in face-to-face closely-abutting contact, extending to the end edges of the sheet, and the next-adjacent portions have the other surface opposite each other, extending beyond the end edges of the end portions of the sheet, and spaced apart by the folded-over abutting sheet ends, the opposed surfaces of the sheet ends and the end edges of the sheet ends defining a space therebetween; disposing a bonding agent in the space and bonding the sheets together therewith at the end edges and the opposed surfaces of the sheet substantially without penetrating the face-to-face end portions of the sheet at the seam to the outer surface of the filter sheet.

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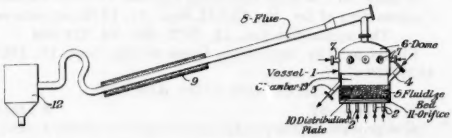
**3,865,920**

## PROCESS FOR BENEFICIATING A TITANIFEROUS ORE AND PRODUCTION OF CHLORINE AND IRON OXIDE

**Wendell E. Dunn, Jr., North Sydney, Australia, assignor to Rutile & Zircon Mines (Newcastle) Limited, Sydney, New South Wales, Australia**

**Filed Mar. 14, 1973, Ser. No. 341,043**
**Int. Cl. C01g *49/06*; C01b *7/02*; C01g *23/04***
**U.S. Cl. 423—74** **11 Claims**




1. In the process for beneficiating a titaniferous ore composed of essentially titanium dioxide and iron oxide to produce a synthetic rutile titanium dioxide product and gaseous iron chlorides wherein a fluidized bed of titaniferous ore mixed with 10–30%, by weight, of coke is contacted with chlorine, at elevated temperatures, to produce a partially chlorinated product whereby the iron oxide contained in said titaniferous ore is selectively converted to iron chlorides and said process is conducted in a reactor having a chamber above the fluidized bed, the improvement which comprises producing chlorine and ferric oxide from said gaseous iron chlorides by:

a. contacting the gaseous iron chlorides, heated to a temperature of 1,250° to 1,380°K, with oxygen in the chamber above the fluidized bed of titaniferous ore to form a gaseous cloud comprised of a partially oxidized mixture of iron chlorides, iron oxide, iron oxide nuclei, oxygen and chlorine;

b. passing the partially oxidized mixture through a cooled flue, at a superficial velocity of at least 50 feet/sec, whereby substantially the remaining iron chloride is further oxidized to chlorine and an equilibrium layer of ferric oxide formed on the inside wall of the flue is continuously abraded by iron oxide solid product passing through the flue, and

c. separating the chlorine from unreacted ferric chloride and ferric oxide.

## 3,865,921
## PROCESS FOR DECONTAMINATION OF HARDENING SALT RESIDUE

**Helmut Reinhardt, Am Dem Stumpelrott 9, 5038 Rodenkirchen; Karl Trebinger, Josef-Zimmermann-Strasse 7; Gottfried Kallrath, Nordstrasse 51, both of 5047 Wesseling, and Helmut Weber, Stettiner Strasse 8, 5040 Bruhl, all of Germany**

**Filed June 19, 1973, Ser. No. 371,498**

**Claims priority, application Germany, June 30, 1972, 2232123**

**Int. Cl. C01c** *3/12*; **C01f** *1/00*

**U.S. Cl. 423—164** **7 Claims**

1. A process of decontaminating a hardening salt residue from treating steel with a hardening salt containing alkaline earth metal at least a part of which is barium and also containing cyanide and alkali chloride containing alkaline earth metal at least a part of which is barium and also containing cyanide comprising slurrying the coarsely broken pieces of salt residue in water and then treating said slurry with an amount of aqueous iron (II) chloride at least sufficient to convert the cyanide portion of said residue to alkali ferrocyanide at a pH of 7–14 and in the presence of alkali carbonate in an amount at least sufficient to convert all of the alkaline earth metal present to the carbonate but not over 30% based on hardening salt residue to be decontaminated, and separating the cyanide containing solution from the carbonate containing precipitate.

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## 3,865,922
## PROCESS FOR THE PREPARATION OF CRYSTALLINE CALCIUM SULPHATE AND PHOSPHORIC ACID

**Jan Th. Boontje, Santpoort, Netherlands, assignor to Verenigde Kunstmestfabrieken Mekog-Albatros N.V., Utrecht, Netherlands**

**Continuation-in-part of Ser. No. 889,097, Dec. 30, 1969, abandoned. This application Apr. 25, 1972, Ser. No. 247,415**

**Claims priority, application Australia, Jan. 8, 1970, 10132/70; Austria, Jan. 8, 1970, 142/70; Belgium, Jan. 8, 1970, 83652; Netherlands, Jan. 10, 1969, 6900394**

**Int. Cl. C01b** *25/16*; **C01f** *1/00*

**U.S. Cl. 423—166** **7 Claims**

1. A process for the preparation of calcium sulphate hemihydrate and phosphoric acid by chemical reaction between sulphuric acid and an aqueous solution containing calcium ions and phosphate ions, in which process sulphuric acid and an aqueous solution containing the calcium ions and phosphate ions are introduced into a body of liquid consisting of a suspension of calcium sulphate hemihydrate in a mixture consisting substantially of phosphoric acid and water, said body of liquid being in the shape of a cylinder with a vertical axis and consisting of a plurality alternating cylindrical sections A and B in vertical succession, the number of section A as well as the number of section B being at least 3, each section A being at its bottom axially connected with the liquid thereunder and at its top peripherically connected with the section of liquid above, shearing forces being exerted tangentially on the top of each section of liquid A, increasing from the axis to the peripherical connection with the adjacent section of liquid above, each section B being at the top axially connected with the liquid above and at its bottom peripherically connected with the section of liquid thereunder, tangential shearing forces being exerted at the bottom of each section of liquid B increasing from the axis to the peripherical connection with the adjacent section of liquid thereunder, said shearing forces provoking movement of liquid in each section, the sulphuric acid and the aqueous solution introduced being mixed with the said body of liquid yielding thereby one single liquid phase, said mixing resulting in a reaction between the sulphuric acid and the calcium ions and phosphate ions introduced so as to form phosphoric acid and a crystalline precipitate of calcium sulphate hemihydrate, the introduction of the sulphuric acid and the aqueous solution into said body of liquid causing in said body of liquid an upward displacement of liquid, said upward displacement of liquid causing fine crystals of the calcium sulphate hemihydrate precipitate to rise through connections between successive sections A and B, such in contradistinction to crystals of said calcium sulphate hemihydrate that have grown so much that their sinking velocity exceeds the speed of the upward current in said connections, removal at the top of said body of liquid of a portion of liquid as displaced by the introduction of the sulphuric acid and the aqueous solution into said body of liquid, and withdrawal of the crystalline precipitate of calcium sulphate hemihydrate at the bottom of said body of liquid.

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## 3,865,923
## CATALYST

**Ruth E. Stephens, Royal Oak, Mich., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Mar. 19, 1973, Ser. No. 342,786**

**Int. Cl. B01d** *53/00*

**U.S. Cl. 423—213.2** **6 Claims**

1. A method of lowering the hydrocarbon and carbon monoxide content of engine exhaust gas under oxidizing conditions and the nitrogen oxides content of engine exhaust gas under reducing conditions comprising contacting said exhaust gas under said oxidizing or reducing conditions at engine exhaust temperature with an exhaust gas catalyst consisting essentially of a uniform metal oxide composition deposited on a catalyst support, said metal oxide composition consisting essentially of about 0.1–10 weight per cent of a first metal selected from the group consisting of copper, nickel and cobalt, 1–20 weight per cent of a rare earth metal, and 0.1–20 weight per cent of manganese, in an oxide form, said percentages based upon the total catalyst weight, the balance of said catalyst consisting of said catalyst support, the atom ratio of the sum of said first metal and said rare earth metal to manganese being 1-3:1, said metal oxide deposit having a Perovskite type crystal structure as shown by X-ray diffraction.

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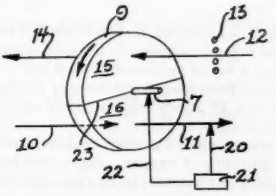
## 3,865,924
## PROCESS FOR REGENERATIVE SORPTION OF $CO_2$

**Dimitri Gidaspow, and Michael Onischak, both of Chicago, Ill., assignors to Institute of Gas Technology, Chicago, Ill.**

**Filed Mar. 3, 1972, Ser. No. 231,530**

**Int. Cl. B01d** *53/34*

**U.S. Cl. 423—230** **12 Claims**




1. A method of removing $CO_2$ from a gases stream comprising the steps of:

a. passing a $CO_2$-containing inlet gas stream into contact with a synergistic sorbent composition of finely divided, particulate alkali metal carbonate and alumina, said alumina and carbonate being separate discrete particles and having been ground together to provide such sorbent, to sorb $CO_2$ thereinto and convert said carbonate to bicarbonate,

b. maintaining said sorbent composition in hydrated form, thereby to remove $CO_2$ from said gases stream; and c. regenerating said sorbent composition by supplying heat to reconvert said bicarbonate to said carbonate form while evolving $CO_2$ therefrom, without forming a crust over said sorbent.

3,865,925

## PRODUCTION OF CARBON BLACK OF REDUCED GRIT CONTENT

King L. Mills, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 3, 1972, Ser. No. 303,329
Int. Cl. C09c *1/50*
U.S. Cl. 423—450 3 Claims

1. In a process for the production of carbon black wherein oil is axially introduced through a nozzle into a precombustion chamber of a carbon black reactor, wherein hot combustion gases resulting from the combustion of hydrocarbon fuel and air are introduced into said precombustion chamber, wherein said oil is pyrolytically decomposed by said hot combustion gases and wherein carbon black is formed during the travel of the materials through a reaction section, the improvement which comprises:

a. carrying out the carbon black production until a preselected amount of grit is contained in the carbon black;

b. changing the axial location of said nozzle to lower the grit production below said presleceted value;

c. adjusting the ratio of the air feed to the oil feed so as to produce carbon black with essentially the same properties as produced during step (a).

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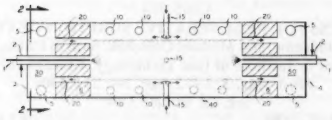
3,865,926

## CARBON BLACK PROCESS USING FLOW REVERSAL

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 8, 1972, Ser. No. 313,538
Int. Cl. C01b *31/02, 1/50*
U.S. Cl. 423—456 6 Claims



1. A method of producing carbon black in a reactor having two ends and being longitudinally disposed which comprises:

a. introducing a liquid hydrocarbon feed and a first gaseous oxidant selected from the group consisting of oxygen, oxygen-enriched air and air axially into an end of said reactor along its longitudinal axis;

b. introducing a second gaseous oxidant selected from the group consisting of oxygen, oxygen-enriched air and air tangentially into said reactor at a plurality of spaced apart loci along the longitudinal axis of said reactor;

c. introducing a gaseous hydrocarbon fuel into said reactor longitudinally apart from the introduction of said liquid hydrocarbon feed;

d. oxidizing said fuel with said second oxidant to produce hot combustion gases containing said second gaseous oxidant positioned adjacent the walls of said reactor;

e. contacting said hydrocarbon feed with said hot combustion gases to pyrolytically decompose said hydrocarbon feed to form carbon black;

f. passing said carbon black in a direction opposite to the direction of hydrocarbon feed within said reactor into contact with said hot combustion gases and second gaseous oxidant to oxidize said black; and,

g. recovering the carbon black produced from said reactor proximate the point of axial introduction of said hydrocarbon feed into said reactor.

3,865,927

## METHOD AND APPARATUS FOR REACTING SULFUR DIOXIDE AND NATURAL GAS

William E. Watson, Mt. Tabor, N.J., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Sept. 15, 1970, Ser. No. 72,455
Int. Cl. C01b *17/04*
U.S. Cl. 423—570 15 Claims

1. A continuous method for the preparation of sulfur from a sulfur-dioxide-containing gas which consists essentially in the steps of:

a. preparing a gaseous reaction mixture of said sulfur-dioxide-containing gas and a gaseous reducing agent selected from the group consisting of at least one of hydrogen, carbon monoxide and a gaseous hydrocarbon,

b. preheating said gaseous reaction mixture to a temperature within the range of about 500° to 700°F.,

c. passing said preheated gaseous reaction mixture in direct heat exchange relationship with a first section of gas permeable bed of a solid, refractory, catalytically-inert material to raise the temperature of the gaseous reaction mixture to between 1,000° and 1,800°F.,

d. passing said heated gaseous reaction mixture from (c) through a bed of catalytically-active material and under equilibrium reaction conditions to effect reduction of said sulfur dioxide to a product gas stream consisting essentially of sulfur and hydrogen sulfide while maintaining the temperature in said catalytic bed within the range of 1,200° to 2,500°F. and a rise in the temperature of the product gas stream exiting from said catalyst bed of between 200° and 400°F.,

e. passing said product gas stream in direct heat exchange relationship through a second section of solid, refractory, catalytically-inert material to reduce the temperature of said product gas stream to about 850° to 1,000°F.,

f. periodically by-passing the second section of catalytically inert bed with the hot product gases to control the temperature of the reaction,

g. reacting the hydrogen sulfide in the product gas stream with sulfur dioxide under reaction conditions sufficient to effect reaction of the hydrogen sulfide and sulfur dioxide to produce elemental sulfur and recovering said sulfur; and

h. continuously reversing the direction of flow of said gaseous reaction mixture through said beds to maintain said catalyst bed at a temperature within the range of 1,200° to 2,500°F. without adding to any of said beds additional heat other than the heat resulting from the reduction reaction effected in the catalytic reaction zone.

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3,865,928

## PREPARATION OF ALUMINUM HYDRIDE

Paul F. Reigler, Midland, and Lz F. Lamoria, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 2, 1965, Ser. No. 437,635
Int. Cl. C01b *6/00*
U.S. Cl. 423—645 4 Claims

1. A novel process for preparing a substantially non-solvated, hexagonal crystal structure aluminum hydride which comprises;

a. reacting under substantially anhydrous conditions in an inert atmosphere a solution of beryllium chloride and lithium aluminum hydride wherein the ratio of lithium aluminum hydride to beryllium chloride in the reaction mixture on a gram mole basis ranges from about 2 to about 5, the solvent for said lithium aluminum hydride and beryllium chloride being a liquid material inert to the reactants and products and dissolving said beryllium chloride and lithium aluminum hydride reactants and the aluminum hydride product produced therefrom,

b. separating the solution of said aluminum hydride from the residual lithium chloride and beryllium values solid products co-produced,
c. removing said solvent from the so-separated aluminum hydride solution,
d. heating the resulting substantially dry aluminum hydride product at an elevated temperature of from about 50° to about 140° C. under reduced pressure for a period of from about 2 to about 24 hours, and
e. recovering a substantially non-solvated, aluminum hydride of hexagonal crystal structure.

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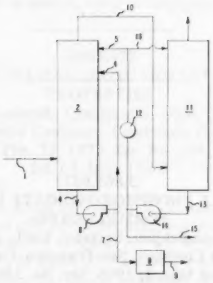
3,865,929

## HYDROGEN FLUORIDE RECOVERY PROCESS

William Hollis Ehlig, Baytown, Tex., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 11, 1972, Ser. No. 296,565
Int. Cl. C01b 7/22
U.S. Cl. 423—488 2 Claims



1. A process for recovering liquid anhydrous hydrogen fluoride comprising
1. feeding crude hydrogen fluoride gas containing sulfur into a gas cooler at a pressure of about 10 to 15 pounds per square inch absolute wherein the gas is cooled to within a range of 0° to 15° C. above the boiling point of hydrogen fluoride at the cooler pressure by a recirculating liquid stream of hydrogen fluoride, said recirculating stream removing sulfur from the crude hydrogen fluoride gas;
2. removing overhead hydrogen fluoride gas essentially free from elemental surfur and compounds which form elemental sulfur under conditions of cooling, condensing the gas to produce liquid hydrogen fluoride, while
3. recycling each unit of the stream through the gas cooler until the sulfur removed from the crude hydrogen fluoride gas builds up to a particle size such that a majority of the particles of sulfur have a particle size of 100 to 150 microns,
4. removing a portion of said recycling stream and filtering the sulfur therefrom,
5. recycling the removed filtered liquid to the process.

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3,865,930

## SELF-HEATING NEUTRALIZING COMPOSITIONS FOR PERMANENT WAVE OPERATION

Jean-Louis Abegg, and Claire Gayet, both of Paris, France, assignors to Societe anonyme dite: L'Oreal, Paris, France

Filed Mar. 29, 1973, Ser. No. 346,025
Claims priority, application Luxembourg, Apr. 4, 1972, 65099
Int. Cl. A61k 7/10
U.S. Cl. 424—72 7 Claims

1. A neutralizing composition to effect the second stage of neutralization of a permanent waving operation, comprising a package having two separate storage means for storing the components of said composition and from which storage means said components are adapted to be dispensed for mixing with each other to provide said composition with the evolution of sensible heat, one of said storage means containing one of said components comprising a water soluble salt selected from the group consisting of sodium, potassium and ammonium sulfite; sodium, potassium and ammonium metabisulfite; and sodium, potassium and ammonium bisulfite and the other of said storage means containing another of said components comprising hydrogen peroxide, the said components being present in amounts such that the resulting mixture of said components exhibits a rise in temperature of about 15°–25° C and contains free $H_2O_2$ in amounts of about 0.5–3 percent by weight of said composition.

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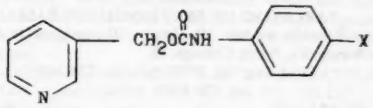
3,865,931

## PYRIDYL PHENYL CARBAMATE RODENTICIDES

J. Edgar Ware, Jr., Quakertown; Edward E. Kilbourn, and David L. Peardon, both of Chalfont, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 235,015, March 15, 1972, abandoned. This application Apr. 19, 1972, Ser. No. 245,608
Int. Cl. A01n 17/14, 9/00, 9/22
U.S. Cl. 424—84 28 Claims

1. A rodenticidal composition comprising 1) a rodenticidally effective amount of a compound having the formula:



wherein X is selected from the group consisting of $-NO_2$, $-CN$, $-CF_3$, $-SCH_3$, $-SOCH_3$, $-SO_2CH_3$ and $-SO_2NH_2$ and 2) a carrier comprising a semi-moist or dry powered material.

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3,865,932

## COMPOUNDS OF COPPER, CHROMIUM AND ARSENIC AS WOOD PRESERVATIVES

Bror Olof Hager, Djursholm, Sweden, assignor to Hager Aktiebolag, Stockholm SV, Sweden

Continuation of Ser. No. 733,825, June 3, 1968, abandoned. This application June 15, 1971, Ser. No. 153,412
Int. Cl. A01n 11/00
U.S. Cl. 424—128 3 Claims

1. A preservative for wood with the following approximate composition

| | |
|---|---|
| CuO | 564 parts by weight |
| $CuSO_4 \cdot 5\ H_2O$ | 589 parts by weight |
| CrO | 991 parts by weight |
| $As_2O_5$ | 600 parts by weight |
| $H_3PO_4$, 85 % | 546 parts by weight. |

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3,865,933

## ANALGESIC COMPOSITION

Clifton F. Mudge, Lakewood, Colo., assignor to C and A Laboratories, Inc., Denver, Colo.

Filed May 24, 1972, Ser. No. 256,307
Int. Cl. A61k 27/00
U.S. Cl. 424—153 4 Claims

1. The method of alleviating pain in a patient comprising the step of administering to said patient an analgesic composition which is relatively free of side effects which comprises as the active ingredients, from 275 to 400 milligrams of mephenesin, from 0.02 to 0.05 milligrams of tropane alkaloids selected from the group consisting of atropine, hyoscyamine, and scopolamine, and from 6 to 100 milligrams of a magnesium compound selected from the group consisting of magnesium gluconate, magnesium acetylsalicylate, hydrated magnesium

bromide, magnesium chloride, magnesium hydroxide, magnesium oxide, magnesium sulfate, and magnesium lactate, together with a pharmaceutically acceptable carrier.

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3,865,934

## METHOD OF ENHANCING MEMORY AND LEARNING

Nicholas Peter Plotnikoff, Lake Bluff, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Apr. 2, 1973, Ser. No. 343,058
Int. Cl. A61k 27/00
U.S. Cl. 424—177 5 Claims

1. The method of enhancing acquisition rate or retention level impairment in a warm-blooded animal comprising administering to an animal having an impaired rate of learning or retention an effective dose of L-pyroglutamyl-L-histidyl-L-prolinamide.

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3,865,935

## TABLETING OF ERYTHROMYCIN BASE

Anton Helmuth Amann, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 10, 1972, Ser. No. 279,600
Int. Cl. A61k 21/00
U.S. Cl. 424—181 8 Claims

1. The process of making a solid non-enteric erythromycin dosage form for oral administration consisting essentially of thoroughly mixing a) erythromycin granules containing erythromycin base and pharmaceutically acceptable excipients readily soluble or dispersible in water or acidic environments, b) anhydrous sodium citrate or sodium citrate dihydrate, c) at least one lubricating agent and d) at least one disintegrating agent and tableting said mixture into a unit dosage form.

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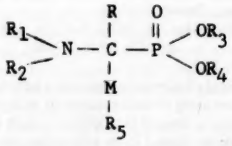
3,865,936

## IN SITU SOIL FUMIGATION FOR COMBATING NEMATODES USING AMINOMETHYLPHOSPHONATES

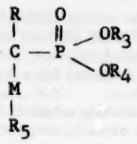
Morton Lewis, Elmhurst, Ill., assignor to Swift & Company, Chicago, Ill.

Division of Ser. No. 112,786, Feb. 4, 1971, Pat. No. 3,821,335.
This application Nov. 23, 1973, Ser. No. 418,428
Int. Cl. A01n 9/36
U.S. Cl. 424—211 6 Claims

1. A method of combating nematodes by fumigating the soil which comprises incorporating into the soil a nematocidally toxic amount of a compound of the formula:



wherein R, $R_1$, and $R_2$ are the same or different and are hydrogen or a straight or branched chained alkyl group of 1 – 30 carbons which may contain non-interfering groups; and $R_1$ may be



$R_3$ and $R_4$ are alkyl or halogenated alkyl groups of from about 1 – 8 carbons; and $R_5$ is hydrogen, or a straight or branched chained alkyl, or alkylaryl group of 1 – 20 carbons which may contain non-interfering groups and M is a member selected from the group consisting of $—CH_2CHXCHX—$ and —CHXCHX— where X is halogen such that, when contacted with sufficient moisture, and intramolecular cyclic reaction will take place between the phosphorus oxygen atom bearing the $R_3$ or $R_4$ group and the carbon atom bearing one of the halogens resulting in the liberation of an alkyl halide fumigant.

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3,865,937

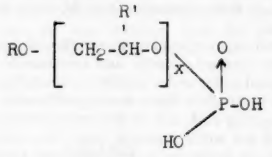
## DRY STABLE PHOSPHOROTHIOATE INSECTICIDE FORMULATIONS

Theodore H. Koundakjian, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 1, 1966, Ser. No. 530,775
Int. Cl. A01n 9/36
U.S. Cl. 424—218 6 Claims

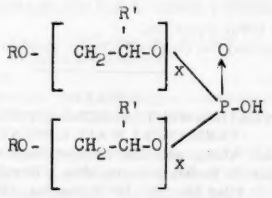
1. A stable dry insecticidal formulation comprising a toxic amount of O,O-dialkyl-O-p-nitrophenyl phosphorothioate wherein the alkyl groups are the same and each contains one to two carbon atoms, adsorbent clay carrier and a sufficient amount of ethylacetoacetate or a mixture of

(1)



and

(2)



wherein R' is hydrogen or methyl, R is an aliphatic or aromatic hydrocarbyl group of about 7 to 40 carbon atoms and *x* is an integer from 4 to 24, said mixture comprising about 65 to 80% by weight (1) and about 20 to 35% by weight (2) to stabilize the formulation.

3,865,938

## NEMATICIDES

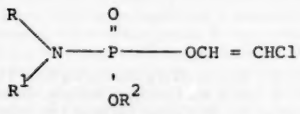
Clyde Warren McBeth, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 329,911, Feb. 5, 1973, abandoned. This application Dec. 26, 1973, Ser. No. 430,994

Int. Cl. A01n 9/36

U.S. Cl. 424—219 5 Claims

1. A method for controlling nematodes which comprises applying to the nematodes a nematicidally effective amount of a compound of the formula



where R and $R^1$ are independently hydrogen, methyl, ethyl or isopropyl, and $R^2$ is methyl, ethyl or isopropyl.

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3,865,939

## EDIBLE OILS HAVING HYPOCHOLESTEROLEMIC PROPERTIES

Ronald James Jandacek, Cincinnatio, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 23, 1973, Ser. No. 335,290

Int. Cl. A61k 17/00

U.S. Cl. 424—238 7 Claims

1. A food composition having hypocholesterolemic activity comprising at least one edible oil in homogeneous admixture with (a) from about 2.0 to about 6.0 wt. % of a plant sterol; (b) from about 0.5 to about 15.0 wt. % of a solubilizing compound selected from the group consisting of saturated and unsaturated fatty acids having from six to 18 carbon atoms, monoesters of said fatty acids with polyhydric alcohols, and alkanols having from six to 18 carbon atoms.

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3,865,940

## PHARMACEUTICAL PREPARATION

Richard Kwizda, and Johannes Kotlan, both of Wien, Austria, assignors to F. Joh. Kwizda, Vienna, Austria

Filed Aug. 10, 1972, Ser. No. 279,734

Claims priority, application Austria, Aug. 19, 1971, 7265/71

Int. Cl. A61k 27/00

U.S. Cl. 424—242 2 Claims

1. A pharmaceutical composition comprising an aqueous solution of dimethyl aminophenazone in a concentration between about 10 and 20%, and

the sodium salt of 1-phenyl-4-n-butyl-3,5-dioxopyrazolidine present in a solubilizing amount, the ratio of said sodium salt to said dimethyl aminophenazone being from about 4:1 to 4:3.

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3,865,941

## THERAPEUTIC COMPOSITIONS AND METHOD EMPLOYING 1-MORPHOLINOMETHYL-5-ETHYL-5-PHENYL BARBITURIC ACID OR THE HYDROCHLORIDE SALT THEREOF

Julius A. Vida, Boston, Mass., assignor to The Kendall Company, Walpole, Mass.

Division of Ser. No. 88,194, Nov. 9, 1970, abandoned. This application Jan. 10, 1973, Ser. No. 322,324

Int. Cl. A61k 27/00

U.S. Cl. 424—248 2 Claims

1. A therapeutic composition for treatment of convulsions in warm-blooded animals comprising a physiologically acceptable carrier and an effective amount for treatment of convulsions of 1-morpholinomethyl-5-ethyl-5-phenyl barbituric acid or the hydrochloride salt thereof.

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3,865,942

## METHOD OF INCREASING CEREBRAL BLOOD FLOW

Pierre Charles Wirth, Paris, France, assignor to Societe Generale De Recherches Et D'Applications Scientifiques "Sogeras", Paris, France

Filed Apr. 28, 1971, Ser. No. 138,314

Int. Cl. A61k 27/00

U.S. Cl. 424—259 2 Claims

1. A method of increasing cerebal blood flow of a patient suffering from cerebal vascular insufficiencies which comprises orally administering a cerebral vasodilating amount of viquidil to the patient.

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3,865,943

## PHARMACEUTICAL COMPOSITIONS CONTAINING AN N-(FURYL-METHYL)-3-OXY-MORPHINAN AND METHOD OF USE

Herbert Merz; Adolf Langbein; Helmut Wick, and Klaus Stockhaus, all of Ingelheim an Rhine, Germany, assignors to Boehringer Ingelheim G.m.b.H., Ingelheim am Rhine, Germany

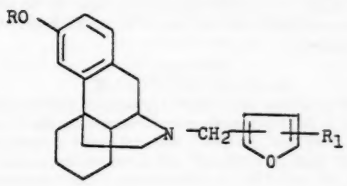
Division of Ser. No. 224,973, Feb. 9, 1972, Pat. No. 3,793,329. This application Dec. 19, 1973, Ser. No. 426,215

Claims priority, application Germany, Feb. 19, 1971, 2107989

Int. Cl. A61k 27/00

U.S. Cl. 424—260 10 Claims

1. A non-narcotic analgesic and antitussive pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective analgesic and antitussive amount of a racemic mixture of a compound of the formula



wherein

R is hydrogen, methyl or acetyl, and

$R_1$ is hydrogen, methyl or ethyl,

an optically active isomer component thereof, or a non-toxic, pharmacologically acceptable acid addition salt of said racemic mixture or optically active isomer.

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3,865,944

## TETRAHYDROPYRIDINE INSECT REPELLENT

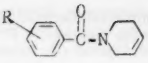
Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, New York, N.Y.

Division of Ser. No. 225,272, Feb. 10, 1972, Pat. No. 3,749,730. This application May 4, 1973, Ser. No. 357,151

Int. Cl. A01r 9/22

U.S. Cl. 424—263 5 Claims

1. A method of repelling houseflies comprising applying to the habitat thereof a repellent amount of a compound of the formula



wherein R is alkyl having one to four carbon atoms, alkoxy having one to four carbon atoms or halogen.

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**3,865,945**

## 1,2,4-TRIAZOLES FOR TREATING GOUT AND HYPERURICEMIA

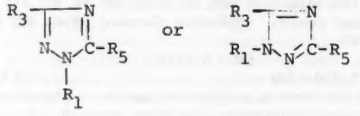
**John J. Baldwin, Lansdale, Montgomery County, and Frederick C. Novello, Berwyn, Chester County, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 269,685, July 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 75,785, Sept. 25, 1970, abandoned. This application Aug. 29, 1973, Ser. No. 392,841**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—263** **20 Claims**

1. A pharmaceutical preparation having xanthine oxidase inhibiting activity useful for treating gout and hyperuricemia in dosage unit form comprising a pharmaceutically acceptable carrier and as the xanthine oxidase inhibiting agent from about 30 mg. to 1.5 g. of a thiadiazole having the formula



or a non-toxic pharmaceutically acceptable salt thereof wherein

$R_1$ is hydrogen or $C_{1-5}$ alkyl;

$R_3$ is mono- or di-substituted phenyl wherein the substituents are chloro, bromo, amino, or acetylamino; and

$R_5$ is pyridyl.

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**3,865,946**

## METHOD OF ANESTHETIZING A MAMMAL BY ADMINISTRATION OF A SUBSTITUTED 2-ARYLALKYLOXY BENZAMIDE

**Michel Leon Thominet, Paris, France, assignor to Societe D'Etudes Scientifiques Et Industrielles De l'Ile-De-France, Paris, France**

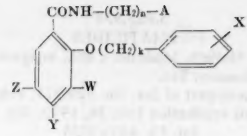
**Division of Ser. No. 324,509, Jan. 17, 1973, , which is a division of Ser. No. 108,963, Jan. 22, 1971, Pat. No. 3,723,416, which is a continuation-in-part of Ser. No. 714,795, March 11, 1968, Pat. No. 3,594,417. This application Dec. 13, 1973, Ser. No. 424,216**

**Claims priority, application France, Apr. 3, 1967, 67.101328; June 23, 1967, 67.111808**

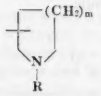
**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—274** **2 Claims**

1. The method of anesthetizing a mammal which comprises administering to said mammal an anesthetically effective amount of a compound selected from the class consisting of 2-arylalkyloxy benzamides and their pharmaceutically acceptable acid and quaternary ammonium salts, said substituted 2-arylalkyloxy benzamides having the formula:



in which A is a monovalent heterocyclic radical having the formula:



in which *m* is 1; R is an alkyl group having from 1 to 5 carbon atoms; W, Y and Z are hydrogen, halogen, amino or alkylamino in which the alkyl group has from 1 to 5 carbon atoms; X is hydrogen or halogen and *k* is 1 or 2; *n* is 1, 2 or 3; at least one of W, Y and Z being other than hydrogen.

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**3,865,947**

## α,β-UNSATURATED ESTERS OF VULPINIC ACID

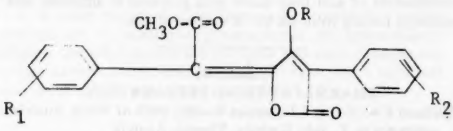
**Blaine M. Sutton, Hatboro, Pa., assignor to Smithkline Corporation, Philadelphia, Pa.**

**Division of Ser. No. 276,020, July 28, 1972, Pat. No. 3,749,740, which is a continuation-in-part of Ser. No. 150,209, June 4, 1971, abandoned. This application May 7, 1973, Ser. No. 357,982**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—285** **2 Claims**

1. A pharmaceutical composition having anti-arthritic activity in dosage unit form comprising a pharmaceutical carrier and from about 10 mg. to about 50 mg. of a chemical compound of the formula:



wherein:

R is acrylyl, methacrylyl, dimethylacrylyl, crotonyl or cinnamoyl; and

$R_1$ and $R_2$ are each hydrogen, chlorine, bromine, fluorine, lower alkyl of from one to four carbon atoms, lower alkoxy of from one to four carbon atoms, dimethoxy, trimethoxy, or trifluoromethyl.

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**3,865,948**

## TREATMENT OF HELMINTH INFECTIONS WITH SUBSTITUTED PHENYL-THIOUREAS

**David Anthony Eichler, Loughton; Joshua Michael Stuart Lucas, High Ongar; George Christopher James Martin, Brentwood; Edgar William Parnell, Hornchurch, and Garth Molesdale Thompson, Upminster, all of England, assignors to May & Baker Limited, Dagenham, Essex, England**

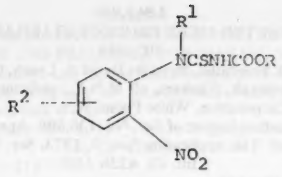
**Filed June 15, 1971, Ser. No. 153,408**

**Claims priority, application Great Britain, Oct. 21, 1970, 50060/70; Apr. 1, 1971, 8463/71**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—300** **11 Claims**

1. Method for the treatment of helminth infections in man and domestic animals which comprises administering to man or a domestic animal infected with helminths an anthelmintically effective amount of at least one benzene derivative of the formula:




wherein R represents an aliphatic hydrocarbon group of 1 to 4 carbon atoms which is unsubstituted or substituted by halogen or alkoxy of 1 to 4 carbon atoms, $R^1$ represents hydrogen or methyl, and $R^2$ represents hydrogen, halogen, alkyl of 1 to 4 carbon atoms, alkanoylamino of 1 to 4 carbon atoms which is unsubstituted or substituted by a cycloalkyl group of 3 to 6 carbon atoms, alkoxycarbonylamino of 2 to 4 carbon atoms, alkanoyl of 2 to 4 carbon atoms, benzoyl or N-methylmethanesulphonylamino.

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**3,865,949**

## PROCESS OF TREATMENT

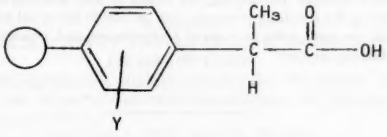
**Margaret E. Greig, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 384,819, Aug. 2, 1973, abandoned, which is a continuation of Ser. No. 258,353, May 31, 1972, abandoned. This application June 14, 1974, Ser. No. 479,213**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—317** **5 Claims**

**1.** A process for the prophylactic treatment of allergy of a reagin or non-reagin mediated nature comprising the systemic administration of from 15 to 200 mg. of a compound of the formula:




wherein

is cyclohexane or

and X and Y can be the same or different and are hydrogen, fluoro, chloro, bromo, alkyl of from 1 to 8 carbon atoms, inclusive, or alkoxy of from 1 to 8 carbon atoms, inclusive, or the pharmacologically acceptable salt thereof in association with a pharmaceutical carrier to a sensitized human or animal subject.

**3,865,950**

## METHYLCYCLOPROPANE ANESTHETICS

**Gerald Joseph O'Neill, Arlington; Charles William Simons, Bedford, and Charles Alden Billings, Concord, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Filed Oct. 23, 1973, Ser. No. 408,709**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—352** **5 Claims**

**1.** The process of inducing anesthesia in a mammal which comprises administering by inhalation to said mammal an effective quantity for inducing a state of anesthesia, of a compound selected from the group consisting of 1-chloro-1,2-difluoro-2-methylcyclopropane, 1-chloro-1-fluoro-2,3-dimethylcyclopropane, 1-chloro-1-fluoro-2-methylcyclopropane and 1-chloro-1-fluoro-2,2-dimethylcyclopropane.

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**3,865,951**

## PRODUCTION OF EDIBLE PROTEIN FROM NON-TOXIC STRAINS OF PENICILLIUM

**Arnold Spicer, Iver Heath, and Gerald L. Solomons, High Wycombe, both of England, assignors to Ranks Hovis McDougall Limited, London, England**

**Continuation of Ser. No. 116,684, Feb. 18, 1971, abandoned. This application Feb. 20, 1973, Ser. No. 333,788**

**Claims priority, application Great Britain, Feb. 25, 1970, 8977/70; Feb. 25, 1970, 8978/70**

**Int. Cl. C12j** *13/06;* **A23j** *3/00*

**U.S. Cl. 426—60** **5 Claims**

**1.** A process for the production of a penicillin free edible protein-containing substance which is suitable for human consumption which comprises incubating and proliferating, under aerobic conditions, a non-toxic and non-penicillin producing strain of *Penicillium notatum* or *Penicillium chrysogenum* or a variant or mutant thereof in a culture medium containing essential growth-promoting nutrient substances, of which carbon in the form of assimilable carbohydrate constitutes the limiting substrate in proliferation, and separating from the assimilable carbohydrate exhausted medium the proliferated organism which is penicillin free and which constitutes the edible protein-containing substance suitable for human consumption possessing a high net protein utilization value of at least 70 based on α-amino nitrogen.

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**3,865,952**

## BLUE CHEESE FLAVOR

**Karl Heinz Ney, Hamburg; I. Poetoe Gde Wirotama, Rellingen, and Wolfram Gustav Freytag, Halstenbek, all of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation-in-part of Ser. No. 240,817, April 3, 1972, abandoned. This application Oct. 1, 1973, Ser. No. 402,426**

**Claims priority, application Luxembourg, Apr. 8, 1971, 62952**

**Int. Cl. A23l** *1/26*

**U.S. Cl. 426—65** **4 Claims**

**1.** A blue cheese flavor composition which comprises a mixture of:

i. from 1 to 8 parts by weight of 1-octen-3-ol,

ii. from 15 to 30 parts by weight of 2-alkanones having from 5 to 15 carbon atoms,

iii. from 40 to 60 parts by weight of alkanoic acids having from 2 to 12 carbon atoms, of which at least 80% contain at least 6 carbon atoms and at most 2% are branched chain alkanoic acids having 4 or 5 carbon atoms,

iv. from 0 to 25 parts by weight of 2-oxoalkanoic acids having from 2 to 6 carbon atoms and 2-oxoalkanedioic acids having 4 or 5 carbon atoms,

v. from 0 to 5 parts by weight of 2-alkanols having from 5 to 9 carbon atoms,

vi. from 0 to 0.2 parts by weight of methyl and ethyl esters of alkanoic acid having from 4 to 8 carbon atoms, and

vii. from 0 to 2 parts by weight of aldehydes having from 2 to 10 carbon atoms.

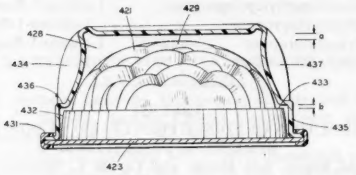
## 3,865,953
## PACKAGING EMBOSSED-SURFACED BUTTER AND MARGARINE

**Leo Peters, 750 Plymouth Rd. S.E., Grand Rapids, Mich. 49506**

**Continuation-in-part of Ser. No. 121,010, March 4, 1971, Pat. No. 3,758,312, and a continuation-in-part of Ser. No. 236,463, March 20, 1972, Pat. No. 3,835,224. This application May 24, 1972, Ser. No. 256,411**

**Int. Cl. B65b** *25/06, 23/00*

**U.S. Cl. 426—124** **11 Claims**




1. A pat package for a soft food such as butter comprising a plate having a substantially flat bottom wall, a soft food pat having a flat bottom supported on said bottom wall and having a surface above said bottom wall equipped with embossments defining ridges and valleys, and a relatively rigid-bodied hard-surfaced type blister cover supported and secured on said bottom wall about said pat flat bottom, said cover being spaced from said embossments a distance great enough to avoid pressures from too close spacing but small enough to avoid unfavorable impact pressures due to movement of the butter, said cover having a shape conforming generally to the collective shape of said ridges but not to said valleys; said embossments of the pat being engageable with the cover when the package is inverted, the cover being shaped to contact, when the package is inverted, a surface area of said ridges of from about 10% to about 25% of the total surface area of both the ridges and the valleys.

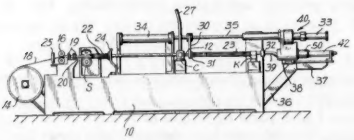
## 3,865,954
## CLOSURE FOR SHIRRED CASING STICKS

**Valdis M. Tums, Palos Park, and Thomas J. Maxwell, Lockport, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Apr. 11, 1972, Ser. No. 242,932**

**Int. Cl. A22c** *13/00*

**U.S. Cl. 426—140** **4 Claims**




1. A hollow shirred food casing stick having casing material from one end thereof progressively twisted into a close-packed funnel-shaped knot configuration about a passage through at least a portion thereof and at least a portion of said twisted casing being implanted within said hollow stick to form an end closure therefor, the funnel shaped configuration of said end closure comprising a first portion of casing material from the end of said stick being progressively twisted into a generally cylindrically shaped knot configuration that is totally within said hollow stick and a second portion of casing material from the end of said casing stick and continuous therewith being progressively twisted into a generally conically shaped knot configuration.

## 3,865,955
## COMMINUTED MEAT PRODUCT STABILIZED WITH JICAMA

**Herman H. Friedman, Bayside; David A. Lysak, Ossining, and John Hornyak, Yonkers, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.**

**Continuation-in-part of Ser. No. 130,800, April 2, 1971, abandoned. This application Nov. 9, 1973, Ser. No. 414,552**

**Int. Cl. A23b** *1/00*

**U.S. Cl. 426—142** **3 Claims**

1. A bacteriologically stable food composition having a moisture content of from about 15 percent to about 50 percent by weight and a water activity of about 0.8 – 0.9 consisting essentially of:

a. a blend of one part by weight of meat normally capable of supporting bacterial growth and comminuted to a particle size ranging from about 30 mesh size to about 400 mesh size (U.S.S. Sieve), and

b. from about one-third to about one part by weight of dehydrated and comminuted uncooked jicama, said jicama having been dehydrated to deplete it of its free water content under conditions whereat its macromolecular cellular structural system is not collapsed and its bound water content undisturbed and having then been comminuted to a particle size ranging from about 70 mesh size to about 400 mesh size (U.S.S. Sieve).

## 3,865,956
## PROCESS FOR PRODUCING SOYBEAN FOOD PASTE AND THE RESULTING PRODUCT

**Danji Fukushima, Omiya; Terumitsu Hattori, and Akira Arai, both of Noda, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda, Noda-shi, Japan**

**Filed Dec. 15, 1972, Ser. No. 315,508**

**Claims priority, application Japan, Dec. 17, 1971, 46-101844; Dec. 21, 1971, 46-103225**

**Int. Cl. A23d** *5/00*

**U.S. Cl. 426—195** **17 Claims**

1. A process for producing an oily soybean food paste, which comprises at atmospheric pressure dry roasting soybeans or defatted soybeans having a moisture content of 17 percent by weight or less at 130° to 300°C. for 4 seconds to thirty minutes, pulverizing the beans to 200 microns or less, mixing the resulting powders with an edible fat or oil which is solid or semi-solid at a room temperature and kneading the resulting mixture.

## 3,865,957
## LOW CALORIE SWEETENER AND SWEETENER BASE

**Hubert Schieweck, Obrigheim; Georg Steinle, Grunstadt, and Ludwig Haberl, Obrigheim, all of Germany, assignors to Sueddeutsche Zucker-Aktiengesellschaft, Mannheim, Germany**

**Filed Apr. 11, 1973, Ser. No. 349,969**

**Claims priority, application Germany, Apr. 12, 1972, 2217628**

**Int. Cl. A23l** *1/26*

**U.S. Cl. 426—213** **13 Claims**

1. A foodstuff or beverage containing a low calorie sweetener agent approximating the taste of natural sugar for human consumption and providing said beverage or foodstuff with a taste normally obtained through pure sugar, said low calorie sweetening agent comprising finely divided, crystalline isomaltitol as the major component, and said sweetener having a degree of purity rendering it suitable in taste, appearance and quality for human consumption.

3,865,958

## EDIBLE COMPOSITIONS HAVING A POULTRY MEAT FLAVOR AND PROCESSES FOR MAKING SAME

Karel W. Breukink, and Michel Van Praag, both of Hilversum, Netherlands, assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Nov. 8, 1972, Ser. No. 304,805
Int. Cl. A23l *1/26*
U.S. Cl. 426—211 4 Claims

1. A process for preparing an edible poultry-flavored composition comprising (A) intimately admixing in the absence of any natural meat or poultry meat products (i) a poultry egg product selected from the group consisting of enzymatic digest of the whole internal contents of poultry eggs and enzymatic digest of poultry egg yolk, with (ii) L-cysteine hydrochloride and (iii) thiamine, said poultry egg product, L-cysteine hydrochloride, and thiamine being present in amounts sufficient to produce a poultry flavor and (B) heating the resulting mixture at a temperature and for a period of time whereby a poultry-flavored product is produced.

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3,865,959

## EDIBLE PROTEIN FIBERS BASED ON CASEIN AND A PROCESS FOR PREPARING SAME

Willem Jan Lecluse, Veenwouden, Netherlands, assignor to Cooperatieve Condensfabriek "FRIESLAND", Leeuwarden, Netherlands

Filed Dec. 8, 1972, Ser. No. 313,255
Claims priority, application Netherlands, Dec. 10, 1971, 7116966
Int. Cl. A23j *3/00*
U.S. Cl. 426—212 9 Claims

9. A method of producing an edible fibrous protein product which comprises:

a. preparing an aqueous solution of casein in dilute sodium hydroxide solution;
b. shaping said solution into fibers;
c. contacting said fibers with an aqueous solution of at least one compound selected from the group consisting of calcium gluconate and calcium lactate until a portion of the sodium ions in said fibers is replaced by calcium ions; and
d. contacting the said fibers with an aqueous solution of phosphate ions.

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3,865,960

## STABILIZATION OF TARTAR IN WINE, GRAPE MUST, OR GRAPE JUICE

Karl Wucherpfennig, Riederbergstrasse 81, Wiesbaden, and Guenter Wysocki, Hohenfriedbergerstrasse 36, Dortmund, both of Germany

Filed July 3, 1973, Ser. No. 376,230
Claims priority, application Germany, July 10, 1972, 2233821
Int. Cl. C12g *1/00*
U.S. Cl. 426—239 6 Claims

1. A method for the stabilization of tartar in wine, grape must, or grape juice by the removal therefrom of sufficient potassium and tartrate ions to inhibit the precipitation of potassium bitartrate, which method comprises electrodialyzing said wine, must, or juice between an anode and a cathode through a first membrane permeable to potassium ions and a second membrane permeable to tartrate ions, in each case against a rinsing liquid present on the side of said membranes opposite said wine, must, or juice and having an osmotic pressure substantially equal to that of the wine, must, or juice being electrodialyzed, whereby potassium ions pass from the wine, must, or juice toward the cathode through said first membrane into rinsing liquid surrounding the cathode and tartrate ions pass from the wine, must, or juice through said second membrane toward the anode into rinsing liquid surrounding the anode.

3,865,961

## ELECTRODIALYZING WINE TO REMOVE SULFUR-CONTAINING COMPOUNDS

Karl Wucherpfennig, Riederbergstrasse 81, Wiesbaden, and Guenter Wysocki, Hohenfriedbergerstrasse 36, Dortmund, both of Germany

Filed July 3, 1973, Ser. No. 376,229
Claims priority, application Germany, July 10, 1972, 2233798
Int. Cl. C12g *1/00*
U.S. Cl. 426—239 1 Claim

1. A method for removing substantial quantities of free and bound sulfurous acid from wine without substantial demineralization thereof, which process comprises electrodialyzing said wine at a direct current voltage of about 7.5 volts to about 30 volts between an anode and a cathode through a first membrane permeable to cations and a second membrane permeable to free and bound sulfurous acid ions, in each case against a rinsing liquid present on the side of said membranes opposite said wine and having an osmotic pressure substantially equal to that of the wine being electrodialyzed, whereby cations pass from the wine toward the cathode through said first membrane into rinsing liquid surrounding the cathode and free and bound sulfurous acid ion pass from the wine toward the anode through said second membrane into rinsing liquid surrounding the anode.

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3,865,962

## METHOD FOR PROVIDING A CONTINUOUS FILM OF ALGIN CONTAINING COATING MATERIAL SURROUNDING A RAW ONION PRODUCT

Roland D. Earle, P.O. Box 1209, Hollywood, Fla. 33022

Continuation of Ser. No. 669,272, Sept. 20, 1967, abandoned.
This application June 9, 1971, Ser. No. 151,565
Int. Cl. A23b *7/00*
U.S. Cl. 426—291 15 Claims

1. A method for preparing a raw onion product comprising the steps of:

a. applying an edible, cold water insoluble finely divided amylaceous material to a raw onion portion

in amounts effective to form a thin layer over the entire outside surface of the raw onion portion,

b. then immersing each insoluble material coated raw onion portion in an aqueous dispersion containing water soluble algin,
c. removing each onion portion from the dispersion, and
d. treating each algin coated onion portion with an aqueous calcium ion containing gelling solution for a period of time sufficient to solidify a substantially continuous film of the alging containing coating material surrounding the onion portion without imparting any bitter taste thereto when the onion portion is consumed.

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3,865,963

## METHOD FOR FOLDING DOUGH

Victor F. Gugler, 8920 Helen Ave., Sun Valley, Calif. 91352

Division of Ser. No. 104,447, Jan. 6, 1971, Pat. No. 3,710,731.
This application Sept. 11, 1972, Ser. No. 288,146
Int. Cl. A21d *8/02*; A21c *3/00*, *9/04*
U.S. Cl. 426—297 2 Claims

1. A process for preparing dough for Danish pastries and the like comprising the steps of:

flowing dough as a narrow strip onto a top surface of a forwardly moving conveyor belt;
severing said strip into dough sections as it moves forward on said conveyor belt; and
lifting only a forward portion of each said dough section relative to a rearward portion thereof as it moves forward with said conveyor belt to automatically fold said forward portion rearwardly onto said forwardly moving rearward portion to produce a series of folded dough sections on said conveyor belt.

**3,865,964**

## COATING THE SURFACE OF FROZEN, FRIED FRENCH FRIES WITH ATOMIZED FAT GLOBULES

**Robert J. Kellermeier; James T. Knight, and Bernadine E. Steljes, all of Ontario, Oreg., assignors to Ore-Ida Foods, Inc., Ontario, Oreg.**

**Division of Ser. No. 124,271, March 15, 1971,. This application June 8, 1973, Ser. No. 368,191**

**Int. Cl. A23b** *7/00*

**U.S. Cl. 426—307** **2 Claims**

1. A method of producing a frozen French fry potato product, comprising deep fat frying French fry potato pieces; freezing said fried French fry potato pieces; atomizing liquid fat using spraying pressures of about 30 to about 400 psig onto the surfaces of said frozen fried French fry potato pieces in an amount of about 1 to about 6 percent by weight of said frozen, fried French fry potato pieces to provide a superficial, discontinuous coating of solidified globules or droplets of said atomized fat adherent to the frozen surfaces of said frozen fried French fry potato pieces.

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**3,865,965**

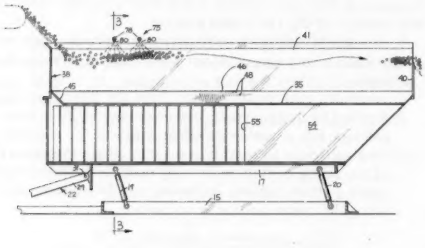
## METHOD FOR COOLING FOOD IN A FLUIDIZED BED

**Walter L. Davis, Milton-Freewater, and Henry V. Svehaug, Salem, both of Oreg., assignors to Key Equipment Company, Milton-Freewater, Oreg.**

**Filed Feb. 2, 1972, Ser. No. 222,808**

**Int. Cl. A23b** *7/04*

**U.S. Cl. 426—519** **4 Claims**




1. A method for cooling a heated food product to room temperature without substantially increasing or decreasing the moisture content of the food product, comprising the steps of:

forming the heated food product in a fluidized bed,

continuously spraying water as a mist onto said product to maintain said heated food product moist while

simultaneously directing air upward through said fluidized bed to evaporate a portion of said sprayed water to rapidly cool said heated food product to approximately ambient room temperature without substantially increasing or decreasing the moisture content of said food product, said air being directed upward through a perforated support at a velocity sufficient to suspend said food product above said perforated support as said fluidized bed;

continuously feeding the food product onto one end of said perforated support; and

vibrating said perforated support in a directional occillational motion to continuously move the food product along said perforated support to another end of said perforated support.

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**3,865,966**

## EXPANDED PROTEIN LATTICE FOOD PRODUCT AND METHOD OF MAKING

**Thomas B. Coppage, Richmond Heights; Ronald J. Flier, Ladue, and Bernard M. Payne, St. Charles, all of Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 280,539, Aug. 14, 1972, abandoned, which is a continuation of Ser. No. 5,983, Jan. 26, 1970, abandoned. This application July 5, 1973, Ser. No. 376,857**

**Int. Cl. A23j** *3/00*

**U.S. Cl. 426—372** **10 Claims**

1. The method of preparing an economical chunk-type complete maintenance canned food composition which incorporates expanded soybean fiber chunks to simulate natural meat chunks in flavor and mastication properties comprising the steps of:

Grinding raw animal meat containing proteinaceous materials to particles of a substantially uniform size;

precooking the ground meat at temperatures of about 160° to 175°F.;

mixing expanded soybean fiber chunks having an expanded fibrous lattice with moisture, oils and flavors therewith;

cooking said chunks with said particles of meat, flavors, moisture and oils at a temperature of 160° to 185°F. for a time which is at least sufficient to coagulate the natural meat protein particles to impregnate the expanded fibrous lattice of the soybean fiber chunks with flavor components of said particles of meat, flavors, and oils to impart the natural meat texture and flavor thereto, said moisture content being at least sufficient to allow absorption of said flavors and oils and cause said particles of meat to adhere to the surface of said chunks;

mixing said impregnated chunks with nutritional materials to form a nutritionally balanced food composition, packing said food composition into a can;

heating said can to about 245° – 250°F. and about 15 p.s.i. for about 65 minutes to cook and sterilize said food composition.

3,865,967

## FLUID PRESSURIZED ELECTRICAL CABLES HAVING MEANS INCORPORATED THEREWITH FOR LOCATING LEAKS

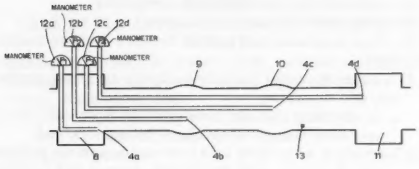
**Jack Pritchett, Amersham, England, assignor to The Post office, London, England**

**Filed Apr. 23, 1973, Ser. No. 353,425**

**Claims priority, application Great Britain, May 5, 1972, 21131/72**

**Int. Cl. H01b** *7/32*; **H02g** *15/28*; **G01m** *3/28*

**U.S. Cl. 174—11 R** **5 Claims**




1. A fluid filled electric cable in which a leak at any point in the cable causes a continuous pressure gradiant drop along the entire cable, said cable comprising a fluid containing sheath, a plurality of fluid impermeable pressure transmitting conduits disposed within said sheath, said conduits each having an open end located within said sheath, said open ends being spaced from one another along the length of said sheath, the other end of each conduit terminating externally of said sheath, and a plurality of individual pressure indicating means, each said other end of said conduits being connected to a respective one of said individual pressure indicating means for indicating the individual pressure at said open end of each conduit.

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3,865,968

## TERMINATORS FOR ELECTRICAL SUPERCONDUCTOR CABLE INSTALLATIONS

**Heinz Heumann, Rheydt, and Helmut Kuhmann, Dusseldorf, both of Germany, assignors to AEG-Telefunken Kabelwerke AG, Rheydt (Rugh)-Saarn, Germany**

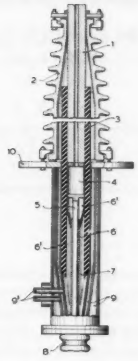
**Filed Oct. 2, 1973, Ser. No. 402,810**

**Claims priority, application Germany, Oct. 6, 1972, 2249801; Oct. 6, 1972, 7237304**

**Int. Cl. H01v** *11/00*

**U.S. Cl. 174—15 BH** **7 Claims**

1. In a terminator for an electrical superconductor cable installation, the terminator including a normal conductor, an external insulator surrounding the normal conductor and arranged to be disposed in an ambient temperature environment, a superconductor cable including a conductor and means maintaining the conductor at a temperature at which it is superconductive, and heat-exchange means defining a zone of temperature increase between the conductor of the superconductor cable and the normal conductor, the terminator presenting a longitudinal axis along which the heat-exchange means are interposed between the conductor of the superconductor cable and the normal conductor, the improvement wherein: said terminator further comprises means defining a zone of electrical field reduction; said electrical field reduction zone is separated from said zone of temperature increase;




and said zone of temperature increase is located axially outside of the region occupied by said external insulator.

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3,865,969

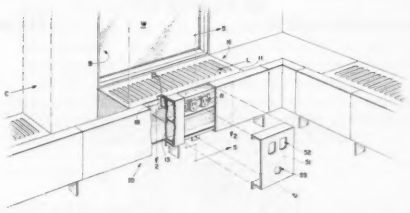
## RADIATOR MOUNTED RACEWAY

**Gerard Edmund Mulvey, 36 Castle Frank Rd., Toronto, Ontario, Canada**

**Filed Sept. 11, 1972, Ser. No. 287,979**

**Int. Cl. H02g** *3/04*

**U.S. Cl. 174—48** **11 Claims**



1. Electrical wiring duct apparatus for use in association with radiator means such as radiator units, convecting units, or the like having housing means, said duct apparatus comprising;

panel means defining at least part of a radiator housing means;

duct back wall means forming a further panel of said housing means, and extending continuously between adjacent housing means, and having upper and lower edges;

duct top wall means extending forwardly from said back wall means adjacent said upper edge thereof;

duct bottom wall means extending forwardly from said back wall means adjacent said lower edge thereof;

duct front wall means extending between said top wall means and said bottom wall means, at least a portion thereof being removeable for access to the interior thereof, and,

mounting means for mounting electrical outlet connection means at spaced intervals therealong.

## 3,865,970
## VACUUM-TIGHT ELECTRIC LEADTHROUGH IN AN ELECTRIC DISCHARGE TUBE

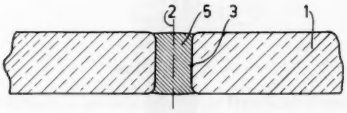
**Gerardus Arnoldus Herman Maria Vrijssen, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 22, 1972, Ser. No. 308,767**

**Claims priority, application Netherlands, Dec. 7, 1971, 7116765**

**Int. Cl. H01j** *5/00*

**U.S. Cl. 174—50.53** **3 Claims**




**1.** An electric discharge tube comprising at least one electric leadthrough, comprising a leadthrough hole and a plug that is disposed in said hole and is thermally bonded at the wall of said hole, said plug consisting essentially of an alloy of indium and at least one of platinum, gold, silver, copper, lead, tin, gallium, nickel, and cobalt.

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## 3,865,971
## SUBMARINE COAXIAL CABLES

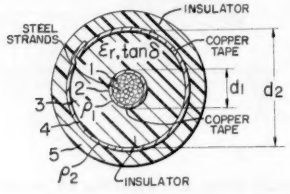
**Denroku Kumagai, Tokyo; Gen Marubayashi, Mito; Kishio Arita, Mito; Shugo Kubo, Mito; Goro Yamauchi, Mito; Toshio Takahashi, Mito, and Toshihiko Sato, Tokyo, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan**

**Filed Aug. 7, 1973, Ser. No. 386,284**

**Claims priority, application Japan, Aug. 8, 1972, 47-79241; Sept. 1, 1972, 47-87624; Sept. 1, 1972, 47-87625; Sept. 1, 1972, 47-87626; Sept. 1, 1972, 47-87627**

**Int. Cl. H01b** *7/18*

**U.S. Cl. 174—102 R** **12 Claims**




**1.** A submarine coaxial cable characterized by comprising

a. an inner conductor,

b. an outer conductor disposed coaxially of said inner conductor and in spaced apart relation therewith to surround the same,

c. an insulating material filling the space between said inner and outer conductors, and

d. said inner conductor being made of a dispersion type conductive material having a temperature coefficient of resistivity lower than that of pure copper and consisting of copper and 0.01–5.00 percent by weight of finely divided powder dispersed in said copper, said finely divided powder being from the group consisting of metal oxides, ferrite, thermistor, carbides, and nickel-copper alloy powder.

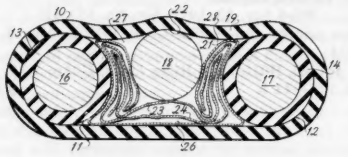
## 3,865,972
## NONMETALLIC SHEATHED CABLE

**Walter R. Norris, Winder, Ga., assignor to The Anaconda Company, New York, N.Y.**

**Filed Feb. 22, 1974, Ser. No. 444,929**

**Int. Cl. H01b** *7/02*

**U.S. Cl. 174—115** **7 Claims**




**1.** A nonmetallic sheathed cable comprising:

A. two parallel insulated conductors,

B. a bare conductor laid parallel between said two conductors,

C. a paper separator partially enclosing said bare conductor, said separator,

a. surrounding said bare conductor on three sides, two of said sides facing said insulated conductors, and

b. opening away from said bare conductors on a fourth side thereof so as to fold slightly around said insulated conductors,

D. an extruded polymeric jacket surrounding said conductors, said jacket comprising a lengthwise groove and said bare conductor fitting directly into said groove on said fourth side.

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## 3,865,973
## STILL PICTURE BROADCASTING RECEIVER

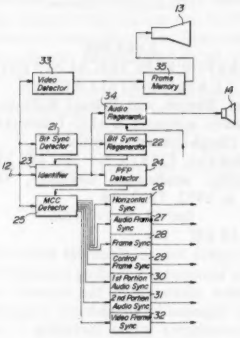
**Michio Masuda, Tokyo; Katsuo Mohri; Hiroaki Nabeyama, both of Yokohama; Teruhiro Takezawa, Tokyo; Hisakichi Yamane, Tokyo; Eiichi Sawabe, Tokyo; Akio Yanagimachi, Kawasaki; Takashi Uehara, Tokyo, and Takehiko Yoshino, Yokohama, all of Japan, assignors to Hitachi Limited and Nippon Hoso Kyokai, both of Tokyo, Japan**

**Filed May 18, 1973, Ser. No. 361,802**

**Claims priority, application Japan, May 23, 1972, 47-050389; Dec. 27, 1972, 47-129796; Feb. 9, 1973, 48-016293**

**Int. Cl. H04n** *5/04, 5/08*

**U.S. Cl. 178—5.8 R** **17 Claims**




**1.** A receiver for receiving a composite signal having a video signal and an audio multiplex signal transmitted alternately in a predetermined sequence, the video signal and the audio multiplex signal including respective pulse coded synchronizing signals having different repetition frequencies in the video signal transmission period and in the audio multiplex signal

transmission period wherein parts of the two pulse coded synchronizing signals inserted in said video signal and said audio multiplex signal have an identical pulse coded mode at a common measure frequency of the two repetition frequencies of said pulse coded synchronizing signals, wherein the receiver comprises:

a coincidence circuit for generating a coincidence signal having a frequency of the common measure frequency of said different repetition frequencies of said two pulse coded synchronizing signals when said pulse coded synchronizing signals having said identical coded mode are supplied, and

a synchronizing signal generator means which is controlled by said coincidence signal for generating signals having the two repetition frequencies and phases of said two pulse coded synchronizing signals so as to reproduce said video signal and audio multiplex signal.

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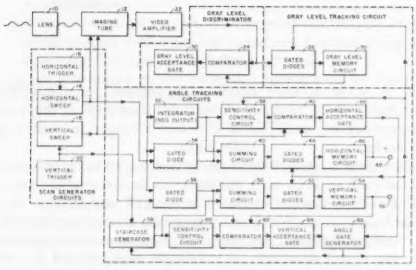
## 3,865,974
## GRAY-LEVEL ANGLE-GATED ELECTRO-OPTICAL SEEKER

**Frederick C. Alpers, Riverside, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 18, 1965, Ser. No. 434,740**
**Int. Cl. G01s 9/62; H04n 3/00**
**U.S. Cl. 178—6.8** **4 Claims**




1. In an electro-optical tracking system, the combination comprising:

a. an imaging tube,

b. a lens for focusing an image of the scene containing the target of interest on the face plate of said imaging tube,

c. scan generation circuit means including a vertical trigger circuit, a horizontal voltage sweep generator and a vertical voltage sweep generator coupled to said imaging tube for electronically scanning the image focused on the face plate of said imaging tube,

d. gray level tracking circuit means including gray level memory circuit means and first gated diodes coupling said imaging tube to said gray level memory circuit means for passing signals to said gray level memory circuit only when there is a change in the gray level signal from said imaging tube, and producing an output signal that is proportional to the gray level of the target being tracked,

e. a gray level discriminating means coupled to said imaging tube and to said gray level tracking circuit means for producing an output signal when the signal received from the imaging tube is the same as the signal received from said gray level tracking circuit means,

f. angle tracking circuit means coupled to said scan generation circuit means and to said gray level discriminating means for passing horizontal and vertical scan voltages in response to the signal from said gray level discriminator that represent the horizontal and vertical coordinates of objects having the same gray level as the target of interest and for then selectively passing only those voltages that represent approximately the same coordinates as the coordinates of the target of interest.

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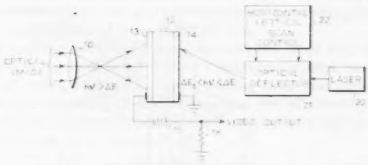
## 3,865,975
## DEEP TRAP, LASER ACTIVATED IMAGE CONVERTING SYSTEM

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Joseph Maserjian, 5668 Pine Cone Rd., La Crescenta, Calif. 91214**

**Filed Aug. 22, 1973, Ser. No. 390,468**
**Int. Cl. H04n 5/30**
**U.S. Cl. 178—7.1** **10 Claims**




1. A system for converting an optical image to an electrical video signal comprising

a film of semiconductor material having deep level traps, said semiconductor material having a band gap between its conduction band and its valence band of energy $\Delta E$, where said traps are of predetermined energy depth $\Delta E_t$ for electrons or holes, or electrons and holes, where $\Delta E_t$ is the larger of said predetermined values for electron and hole traps when both are present,

a conductive plate on each side of said film, at least one of said plates being transparent,

means for focusing said optical image on said film through a transparent one of said plates, said image having photons of energy $h\nu$ greater than said energy $\Delta E$ for producing electron-hole pairs in said semiconductor material for electrons, or holes, or both electrons and holes to be trapped by said deep level trap states,

means for producing a high intensity beam of energy $h\nu'$, where $\Delta E_t < h\nu' < \Delta E$,

means for deflecting said beam across said semiconductor film through one of said plates, thereby exciting any electrons and holes in said trap states into conduction and valence bands of said semiconductor material, and

means connected to said conductive plates for detecting photocurrent produced by any electrons and holes excited into said conduction and valence bands.

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## 3,865,976
## ZONE GRID ASSEMBLY PARTICULARLY FOR HIGH RESOLUTION RADIOACTIVITY DISTRIBUTION DETECTION SYSTEMS

**Raymond P. Grenier, Wilmington, Mass., assignor to Baird-Atomic, Inc., Bedford, Mass.**

**Division of Ser. No. 258,073, May 30, 1972, Pat. No. 3,787,685. This application Mar. 22, 1973, Ser. No. 343,633**
**Int. Cl. G11c 11/06; G08c 21/00**
**U.S. Cl. 178—18** **9 Claims**

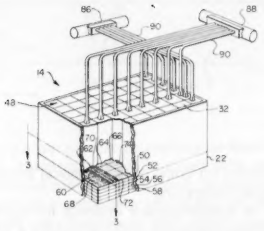
1. A position identifying device comprising:

a. a base formed with a plurality of bores arranged in a pattern;

b. a spherical contacting member retained in each said bore, the diameter of each said contacting member being less than the diameter of each said bore, the depth of each said bore greater than the diameter of each said contacting member, each said contacting member slidable between first and second positions;

c. a printed circuit board formed with a plurality of holes, arcuate conductor pairs and elongated conductors, said holes arranged in a pattern corresponding to said pattern of bores, said printed circuit board mounted on said base

in face to face relationship, said bores and said holes in axial relationship, the diameter of each said hole being less than the diameter of each said contacting member, one of each said arcuate conductor pairs disposed about the periphery of one of each said holes, each said arcuate conductor pair defining first and second conductors, each said contacting member operative to engage and disengage said conductor pair, said contacting members in engagement with said conductor pair when in said first position and disengaged from said conductor pair when in said second position, said first conductor electrically isolated from said second conductor when said conducting member associated therewith is in said second position, an electrical path established between said first and second conductors through said associated contacting member in said first position, one end of certain ones of said elongated conductors connected to selected ones of said first conductors, one end of certain others of said elongated conductors connected to selected other ones of said second conductors, the other ends of said elongated conductors defining a plurality of terminal means, a pair of said terminal means uniquely associated with each said hole; and



d. means for selectively actuating said contacting members into said first position, a pair of said terminal means uniquely identifying the position of said actuated contacting member.

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**3,865,977**

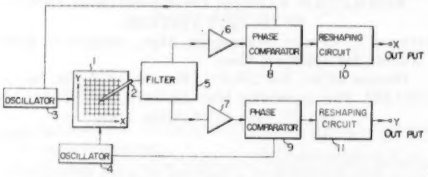
**A SYSTEM FOR IDENTIFYING THE POSITION OF A STYLUS**

**Hisao Hiraki, Nishinomiya, and Katsuhiko Miyagawa, Toyonaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 23, 1973, Ser. No. 353,712**

**Int. Cl. G08c** *21/00*

**U.S. Cl. 178—19** **3 Claims**




1. A system for identifying the position of a pen comprising a two dimensional array having vertical and horizontal terminal groups of lattice electrodes, a pen movable over said lattice electrodes, two oscillators having frequencies different from each other, a plurality of phase shifters provided for each of said oscillators to shift the phase of the output thereof, and a plurality of impedance elements connected in series across the terminals of each of said plurality of phase shifters so that each terminal of the vertical and horizontal terminal groups of said lattice electrodes is connected to the associated one of the junction points of said impedance elements of said phase shifters, said plurality of impedance elements including a series circuit of resistors and capacitors, whereby said phase-shifted signals are read out at each position of said pen over said lattice electrodes to thereby identify the position of said pen.

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**3,865,978**

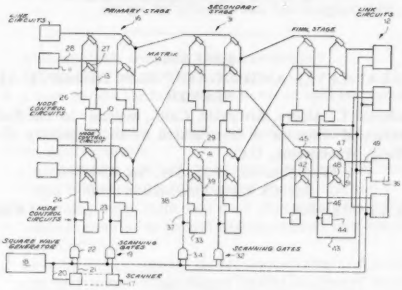
**NODE CONTROL CIRCUITRY**

**Alfred Hestad, Chicago, Ill., assignor to Control Networks Corporation, Chicago, Ill.**

**Filed June 21, 1973, Ser. No. 372,099**

**Int. Cl. H04m** *7/06*

**U.S. Cl. 179—18 GF** **10 Claims**



1. A node control circuit arrangement for controlling switchable three terminal cross point elements at the nodes interconnecting multiples in matrices arranged in multi-stage networks,

said multi-stage networks being connected to be controlled at each node by node control circuits common to a plurality of cross point elements in each of said stages,

said node control circuits comprising test means including differential level detector means connected to determine the signal condition of a multiple being tested at a test point on one side of the switchable cross point elements, said differential level detector means providing an output signal when the signal at the said one side varies from a reference signal by a pre-determined amount,

said test means further comprising constant current generator means coupled to said test point for limiting the current flow at said test point to thereby minimize attenuation by said test means,

said node control circuit arrangement further including scanner means for sequentially supplying scanner signals to the node control circuit in at least some of the stages of said multi-stage network, and

node control gate means operated responsive to the simultaneous receipt of said output signal from said level detector and said scanner signals to provide a cross point element switching signal for switching said cross point element.

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**3,865,979**

**MATRIX CONTROL CIRCUIT**

**Alfred Hestad, 2518 N. Kilbourn, Chicago, Ill. 60639**

**Filed June 21, 1973, Ser. No. 372,225**

**Int. Cl. H04m** *7/06*

**U.S. Cl. 179—18 GF** **10 Claims**

1. A matrix control switching arrangement for use with automatic switching systems to interconnect selected inlets and outlets,

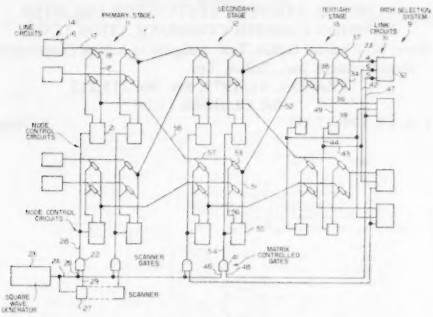
said system comprising a plurality of cascaded matrices arranged in first, intermediate and final stages,

each matrix including intersecting horizontal and vertical busses,

cross point switching elements for selectively interconnecting selected ones of said horizontal and vertical busses,

said switching elements comprising switching devices having separate control paths and communication paths,

a matrix control arrangement for applying end marking potentials at the output side of the network to cooperate with end marking potentials at the input side of the net-



work to cause a fan out beginning at the end marked points and extending through the network,

said matrix control arrangement being common to a plurality of matrices,

said matrix control circuit arrangement comprising means using ground end marking potentials for detecting and switching through the switching network, and

means responsive to the switching through of the path for providing holding current therefor.

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**3,865,980**

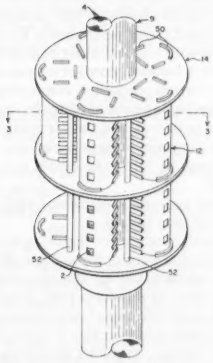
## LOADING COIL MEANS FOR MULTI-CONDUCTOR CABLE

**Jessie Lee Moser, Highpoint; Robert Philmore Reavis, Jr., Statesville, and Melvin Andrew Soderstrom, Advance, all of N.C., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 27, 1974, Ser. No. 446,436**

**Int. Cl. H01f** *15/02, 15/12, 17/08*

**U.S. Cl. 178—46** **5 Claims**



**1.** In combination with a short section of a multi-conductor cable comprising a plurality of pairs of associated conductors, a loading coil assembly for connecting a coil to each of said pairs, said loading coil assembly comprising:

a plurality of supporting trays, each of said trays comprising a plate-like member having a central opening, said trays being mounted in spaced-apart relationship on said short section of cable with said cable extending through said central openings,

a plurality of coil housings, each of said housings having a plurality of coil receiving cells, said cells being arranged in a single row, each of said cells having a coil containaed therein,

each of said housings being mounted between adjacent trays with said rows extending parallel to the axis of said cable, each of said housings having opposite ends, said ends of each housing being supported by the opposed faces of adjacent trays,

each of said housings having laterally opposite facing sides extending between said ends, electrical connecting means mounted on said sides for each coil,

said cable conductors extending laterally from said cable and being connected to said connecting means, and the lead wires from said coils extending from said coils and being connected to said connecting means whereby

each of said conductors in said short section of cable in connected to one of said coils.

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**3,865,981**

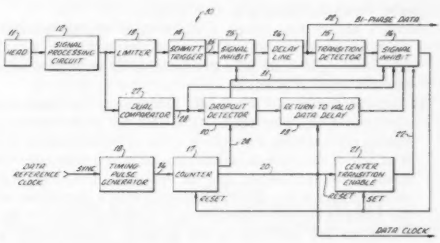
## CLOCK SIGNAL ASSURANCE IN DIGITAL DATA COMMUNICATION SYSTEMS

**James P. Welch, Glendora, and Stephen R. Siegel, Los Angeles, both of Calif., assignors to Odetics, Inc., Anaheim, Calif.**

**Filed July 16, 1973, Ser. No. 379,304**

**Int. Cl. H04l** *7/00*

**U.S. Cl. 178—69.5** **32 Claims**




**20.** A digital data communication system responsive to input data, in analog form, synchronized by a reference clock comprising:

delay means responsive to said data for delaying said data by approximately one-quarter of the period of the highest frequency of said data;

detector means responsive to the output of said delay means for generating a pulse for each leading and trailing edge transition of said delayed data;

a recirculating counter having a reset input and a timing pulse input;

first gate means interposed between the output of said detector means and said reset input of said counter, said transition pulses being utilized to reset said counter;

means responsive to said data reference clock for generating a plurality of coherent timing pulses, said timing pulses being applied to said timing pulse input of said counter for clocking the same;

means responsive to at least one selected count output of said counter for generating a coherent clock signal for said data; and

means responsive to said data for generating a data dropout signal when the amplitude level of said data falls below a predetermined reference level, said data dropout signal being applied to said first gate means for inhibiting said transitions of said data from resetting said counter, whereby said counter continues to circulate, under the

control of said timing pulses, at least one selected count output of said counter being used to generate an artificial clock signal during the duration of said dropout signal.

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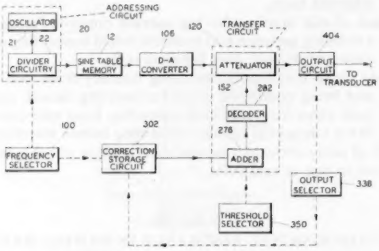
**3,865,982**

## DIGITAL AUDIOMETRY APPARATUS AND METHOD

**Stanley Feldman, Evanston, and William J. Mellenthin, Arlington Heights, both of Ill., assignors to Belton Electronics Corporation, Chicago, Ill.**

**Filed May 15, 1973, Ser. No. 360,554**
**Int. Cl. H04r** *29/00*
**U.S. Cl. 179—1 N** **27 Claims**




**1.** In an audiometer including a transducer for producing a first sound pressure wave having a first frequency and a first period and for producing a second sound pressure wave having a second frequency and a second period, improved apparatus for generating and controlling electrical signals that energize the transducer to produce the first and second sound pressure waves comprising in combination:

memory means for storing a plurality of digital number signals representing digital numbers, each number signal representing a value of a predetermined waveform at a discrete angular position;

addressing means for cyclically addressing the memory means at a first rate such that a first set of the number signals representing a complete cycle of the waveform are read out of the memory means during a first time interval equal to the first period and for cyclically addressing the memory means at a second rate such that a second set of the number signals representing a complete cycle of the waveform are read out of the memory means during a second time interval equal to the second period;

converter means for converting the first set of number signals into a first analog signal having the first frequency and for converting the second set of number signals into a second analog signal having the second frequency;

output means for coupling the first and second analog signals to the transducer;

frequency selector means operable in a first condition for causing the addressing means to address the memory means at the firt rate so that the first analog signal is produced and operable in a second condition for causing the address means to address the memory means at the second rate so that the second analog signal is produced; threshold selector means for generating a threshold signal having a value proportional to the magnitude of the sound pressure level desired;

storage means for storing a first digital correction signal having a value representing a correction in the magnitude of the first analog signal and for storing a second digital correction signal having a value representing a correction in the magnitude of the second analog signal; and

a variable gain transfer means connected between the converter means and the output means and responsive to the threshold signal and the first digital correction signal during operation of the frequency selector means in the first condition for altering the magnitude of the first analog signal so that a sound pressure wave having the first frequency and a first predetermined magnitude is produced by the transducer, said transfer means being responsive to the threshold signal and the second digital correction signal during the operation of the frequency selector means in the second condition for altering the magnitude of the second analog signal so that a sound pressure wave having the second frequency and a second predetermined magnitude is produced by the transducer.

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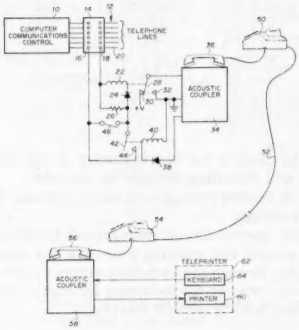
**3,865,983**

## ACOUSTIC COUPLER SYSTEM FOR USE WITH COMMON CARRIER COMMUNICATION LINES

**Barry M. Epstein, Dallas, Tex., assignor to Action Communications Systems, Inc., Dallas, Tex.**

**Filed Dec. 14, 1972, Ser. No. 315,213**
**Int. Cl. H04m** *11/06*
**U.S. Cl. 179—2 DP** **5 Claims**




**1.** A testing system for coupling to a plurality of common carrier communications lines wherein digital data is transmitted to and received from a plurality of data terminals under the control of a computer comprising:

means for selective connection to one of said common carrier communications lines,

means connected with said selective connection means for converting current variations in said selected common carrier communications line representative of said digital data to voltage variations, said current variation converting means including a first relay having a coil connected in series with said selected common carrier communications line, and further having a first switch controlled by said first relay and being positionable by said first relay for engagement with a first contact connected to a source of voltage and a second contact connected to circuit ground, said current variation converting means also including means having substantially the same impedance characteristics as one of said date terminals,

means for converting said voltage variations into tone signals and for coupling said tone signals to a conventional telephone link,

means at a remote station for displaying said digital data in response to said tone signals,

means at said remote station for inputting tone signals representative of digital data onto said telephone link,

means at said common carrier communications line for receiving said tone signals from said remote station and for converting said tone signals into voltage variations,

means connected with said tone signal converting means for receiving said voltage variations therefrom and for converting said voltage variations into current variations, said means including a second relay and a second switch controlled by said second relay, and

means for connecting said second switch with said selective connection means and said current variation converting means for thereby inputting said current variations into

said selected common carrier communications line for operation of said data terminals connected therewith.

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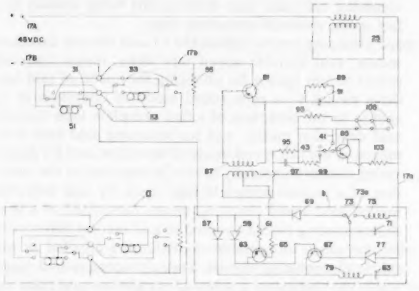
**3,865,984**

## CLOSED LOOP COMMUNICATION WIRE SYSTEM

**Lionel Lee Ewing, Apt. 21-B, 750 Maple St., Mansfield, Ohio 44906**

**Filed Dec. 18, 1972, Ser. No. 316,078**
**Int. Cl. H04m** *11/00*
**U.S. Cl. 179—2 A** **20 Claims**



**1.** A closed loop system for controlling the actuation of an electrical or electro/mechanical device on one or more local stations from a single control station utilizing a single pair of communication wires comprising:

a direct current voltage source connected to said communication wires and for transferring a direct current voltage from said control station to each of said local stations,

capacitor circuit means at the local station for storing said voltage,

an electrical actuating device at the local station, and

switching means at said control station connecting through said communication lines said electrical actuating device to said capacitor circuit means;

a variable period oscillator,

means connected to said electrical or electro/mechanical device to reflect its state of actuation,

tuning circuit means connecting said last named means to said signal generator to control the period of oscillation in accordance with said state of actuation; and

means for connecting said signal generator to said communication wires to return electrical signals to said control station indicative of said state of actuation.

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**3,865,985**

## TELEPHONE CONTROL SYSTEM HAVING WAKEUP, MESSAGE WAITING, SPECIAL MESSAGE AND FIRE ALERT MODES

**Robert W. Stankus, Fairfield, Conn., assignor to Letot, Incorporated, Fairfield, Conn.**

**Filed Sept. 7, 1973, Ser. No. 395,186**
**Int. Cl. H04m** *11/04*
**U.S. Cl. 179—5 P** **10 Claims**

**1.** A telephone message control system for use with at least one telephone connected to a telephone substation by telephone wires by way of a calling unit associated with each telephone and where each telephone has a manually operated switch which in one position is adapted to connect the telephone for audio communication and in a second position to connect the telephone to a calling signal means, said control system comprising:

a. A first calling signal means for supplying a first pulsating calling signal,

b. A first audio communication means for providing a first audio message,

c. A second calling signal means for supplying a second pulsating calling signal,

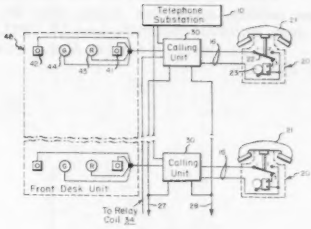
d. A second audio communication means for providing a second audio message,

e. A first message actuation means,

f. A second message actuation means,

g. A message control circuit including:

i. means for connecting said first calling signal means and said first audio transmission means to each said calling unit and disconnecting said second calling means and said second audio transmission means from each said calling unit when said first message actuation means is actuated, and




ii. means for connecting said second calling signal means and said second audio transmission means to each said calling unit and disconnecting said first calling signal means and said first audio transmission means from each said calling unit when said second actuation means is actuated, and

h. Telephone acutation means associated with each said telephone for selectively disconnecting the telephone wires from said substation and connecting said wires to a calling signal means and audio transmission means connected to the associated calling unit by the message control circuit.

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**3,865,986**

## VOICE OPERATED ELECTRIC CIRCUIT

**James R. Darwood, Cerritos, Calif., assignor to T.A.D. Avanti, Inc., Paramount, Calif.**

**Filed Oct. 3, 1973, Ser. No. 403,035**
**Int. Cl. H04m** *1/64*
**U.S. Cl. 179—6 R** **10 Claims**

**1.** A circuit for use in a telephone answering system, or the like, including: an input circuit for receiving signals in a particular frequency range; and a double-balanced integrator coupled to said input circuit for receiving a cyclic input signal and the complement of said cyclic input signal from said input circuit in response to the first-named signals, said integrator including first and second capacitors, a first transistor circuit connected to said input circuit and to said capacitors for introducing a charge to said first capacitor during a first portion of each cycle of the input signal received from said input circuit and for discharging said capacitor at the end of each

cycle of such input signal, and a second transistor circuit connected to said input circuit and to said capacitors for introducing a charge to said second capacitor during a first portion of each cycle of the complement of such input signal received from said input circuit and for discharging said first capacitor at the end of each cycle of such complement signal.

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**3,865,987**

## AUTOMATIC TELEPHONE ANSWERING SYSTEM WITH VARIABLE SPEED DRIVE CONTROL

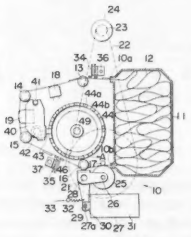
**Kozo Yamamoto, and Isao Shinohara, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan**

**Filed May 22, 1973, Ser. No. 362,936**

**Claims priority, application Japan, May 25, 1972, 47-52089; June 20, 1972, 47-73547; June 20, 1972, 47-73548**

**Int. Cl. H04m** *1/64;* **G11b** *5/48, 21/08*

**U.S. Cl. 179—6 R** **1 Claim**



1. An automatic telephone answering system employing a multichannel, endless magnetic tape traveling along a path and having one channel for the playback of a previously recorded answer to callers and a plurality of channels for the recording of messages from callers, comprising: a variable speed tape drive means for driving said tape and operatively connected thereto, said tape drive means comprised of a variable speed motor; first detection means for detecting each completion by said endless magnetic tape of a complete cycle of travel around its first path, said first detection means comprised of a detector operatively positioned adjacent the path of said endless magnetic tape for detecting completion of each cycle of travel of said tape, a first detection circuit coupled to said detector, said first detection circuit normally producing an output, said output terminating in respnse to a detection by said detector, and a first JK flip-flop coupled to said first detection circuit and gated thereby;

a speed control means operatively connected to said first detection means and said tape drive means, said speed control means being responsive to said first detection means for changing the speed at which said tape drive means said endless magnetic tape, for causing said endless magnetic tape to be driven more slowly during recording of messages than during playback of the previously recorded answer, said speed control means comprised of a changeover circuit coupled to said J-K flip-flop, said changeover circuit including three relays, a first relay being coupled to said variable speed motor for switching said motor from high speed to low speed and normally positioned for high speed operation, a second relay being coupled to recording and reproducing heads and normally to said reproducing head and adapted for switching to said recording head upon activation of said second relay upon completion of a first cycle of tape travel, and a third relay coupled to a warning circuit;

second detection means connected to a telephone for detecting an incoming telephone call and producing an output indicative thereof, said second detection means including a second detecting circuit coupled to the telephone line and producing an output signal in response to an incoming telephone call, a first differentiating circuit coupled to said second detecting circuit and producing an output in response to the output signal from said first detecting circuit, an RS flip-flop having inputs and and an output, one of said inputs coupled to said first differentiating circuit, a second differentiating circuit coupled between an input of said RS flip-flop and the output of said JK flip-flop, whereby output from said first differentiation circuit turns said RS flip-flop on;

power supply means connected to said variable speed tape drive means and said second detection means for supplying power to said tape drive means in response to an incoming call, said tape drive means being initially in a fast speed mode of operation; and

speed changing means connected to said second detection means, said variable speed tape drive means and said power supply means for changing the speed of said tape drive means to a slow speed mode of operation in response to the detection of a first complete tape cycle by said detection means, and for returning said tape drive means to the fast speed mode of operation and for deactivating said power supply means in response to the detection of a second complete tape cycle by said detection means, said speed changing means comprised of a third differentiating circuit coupled to said second differentiating circuit, a monostable multivibrator coupled to said third differentiating circuit, a relay coupled to said monostable multivibrator, a solenoid coupled to said relay and to said variable speed control means, a switch coupled to said solenoid and a pulley coupled to said switch, said pulley adapted to shift said recording head to a next track on the tape.

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**3,865,988**

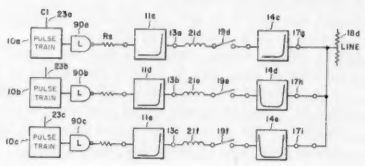
## PULSE TRAIN WAVE SHAPING MEANS AND METHOD

**Lawrence E. Getgen, Redwood City, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed July 5, 1973, Ser. No. 376,488**

**Int. Cl. H04j** *3/00*

**U.S. Cl. 179—15 AA** **23 Claims**



1. In a communications system having means for converting a pulse data train into waveforms for transmission, the improvement comprising a resonant transfer circuit arrangement having:

an energy storage device having an input adapted for connection to said pulse data train and an output;

a wave shaping filter compatible with said device for operation in a resonant transfer mode, said filter having impulse response zeros at multiples of said sampling frequency, and having an input and having an output adapted for connection to a transmission line;

a. gate connecting the output of said device to said filter input;

means for periodically closing and opening said gate at a sampling frequency to periodically transfer energy stored in said device as impulses to said filter;

means providing a clock frequency for the pulse data train; and

means controlling said clock frequency relative to said sampling frequency.

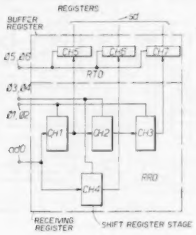
## 3,865,989
## SWITCHING MODULE FOR A PCM SWITCHING SYSTEM

**Pierre Charransol; Jacques Hauri, and Claude Athenes, all of Paris, France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Nov. 20, 1972, Ser. No. 308,295**

**Int. Cl. H04j** *3/02*

**U.S. Cl. 179—15 AQ** **1 Claim**




1. A switching module comprising m output terminals, n input terminals, m times n switching circuits enabling the connection of each of the m outputs to any one of the n inputs, an address conductor for each output, a receiving register coupled to receive over one of said address conductors a multi-bit coded address supplying the identity of an input, said multi-bit coded address being in the form of a series signal including at least three data bits, a buffer register coupled to the receiving register to receive an address from the receiving register and to store it while the receiving register becomes available for the reception of a subsequent address, said register including a first chain of transistors which receives and registers the first bit, a second chain of transistors which receives and registers the second bit and a third chain of transistors which receives and registers the first bit while the second bit is being received, said first bit being supplied to the third chain by the first chain which then finally becomes available for receiving and registering the third bit sent, said receiving register including a fourth chain of transistors which receives the first bit registered by said third chain while the third bit is being received, whereby every bit is passed through an odd number of chains, providing each bit with the correct polarity in parallel at a separate terminal of said buffer register, circuits coupled to the buffer register to decode the addresses in the buffer register and means coupling one of said switching circuits to receive the decoded adddresses and connect a selected input to a selected output, whereby the module has a comparatively large number of crosspoint switching circuits and operates at a comparatively high speed, while requiring a reasonable number of input/output conductors.

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## 3,865,990
## RADIO RELAY SYSTEMS

**Friedrich Kuenemund, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany**

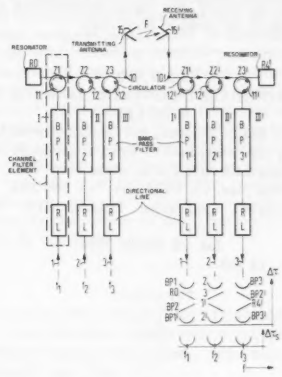
**Filed Mar. 22, 1973, Ser. No. 343,854**

**Claims priority, application Germany, Mar. 22, 1972, 2213962**

**Int. Cl. H04j** *1/08*

**U.S. Cl. 179—15 FD** **4 Claims**

3. A radio relay system in which several adjacent high frequency channels are combined to form a high frequency group, comprising: a transmitting station including a transmitting antenna, a plurality of first three-arm circulators connected in cascade to said antenna, and a plurality of first channel band pass filters each connected to an arm of a respective first circulator, said first filters arranged with the filter centered at the highest channel frequency connected to the first circulator adjacent said transmitting antenna and the filter of the lowest channel frequency connected to the circulator which is farthest from said transmitting antenna; and a receiving station including a receiving antenna, a plurality of second three-arm circulators connected in cascade to said receiving antenna, and a plurality of second channel band pass filters connected to an arm of a respective second circulator, said second filters arranged with the filter of the lowest channel frequency connected to that second circulator which is adjacent said receiving antenna and the filter of the highest




channel frequency connected to the circulator which is farthest from said receiving antenna, the circulation direction of said circulators being the same in the respective circulator cascades, a first resonator in said transmitting station connected to the arm of said farthest first circulator which follows the arm which is connected the respective channel filter as viewed in the direction of circulation, and a second resonator in said receiving station connected to the arm of said farthest second circulator which precedes the arm which is connected to the respective channel filter as viewed in the direction of circulation.

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## 3,865,991
## SIGNAL ROUTING DEVICE FOR A PARALLEL TRANSMISSION AND/OR SWITCHING NETWORK OF CODED SIGNALS

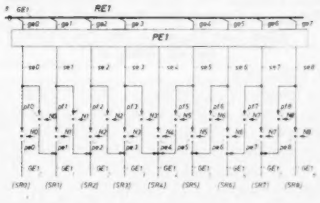
**Pierre Charransol; Jacques Hauri, both of Paris, and Serge Robert Fontana, Elancourt, all of France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed June 28, 1973, Ser. No. 374,312**

**Claims priority, application France, July 13, 1972, 72.25409**

**Int. Cl. H04j** *3/14*

**U.S. Cl. 179—15 BF** **2 Claims**




1. A signal routing system in a switching network for transmitting coded signals in parallel, the system comprising switching means coupling each input to an output of the network, said system having *n* signal accesses arranged according to a certain order and *n*+1 network accesses also arranged

according to a certain order and corresponding to $n+1$ network sections, as well as normal switching means associating, in rest condition, the $n$ signal accesses with the $n$ network accesses of corresponding ranks, the $n+1$th network access of rank $p$ corresponding to the emergency section network, the signal routing system comprising "onto emergency" switching means provided for associating, in case of failure in one network section of rank $m$, the signal accesses of ranks $m$ to $p-1$ to the network accesses of ranks $m+1$ to $p$, whereby each signal access is connected either to the network access of the same rank, at rest, or to the network access of the following rank, in case of failure, the signal transmission conditions remaining almost the same in both cases.

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## 3,865,992
## ELECTRONICALLY CONTROLLED RING-TRAP CIRCUIT

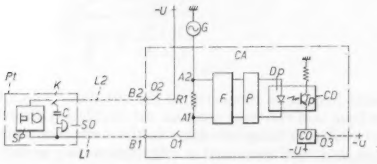
**Lucien Robert Bouty, Fresnes, and Gerard Marcel LeCardonnel, Neuilly-sur-Seine, both of France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Nov. 15, 1972, Ser. No. 306,594**

**Claims priority, application France, Nov. 17, 1971, 71.41072**

**Int. Cl. H04m** *3/04*

**U.S. Cl. 179—18 HB** **7 Claims**




1. A ring-trip circuit comprising a photoemissive detecting circuit associated with a telephone line, said photo-emissive detecting circuit including photoemissive means and photosensitive means, a switching circuit optically coupled via the photo sensitive means to the photoemissve means and controlled by the latter, filter means coupling the photoemissive means to the telephone line to restrict the transmission of alternating current to the photoemissive means, said photoemissive means responding to direct current along the telephone line to emit light and complete the optical couple to the switching circuit, the switching circuit including contacts over which alternating ringing current signals are supplied to the telephone line, and the switching circuit responding to completion of said optical couple to open said contacts and remove alternating ringing current from the line.

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## 3,865,993
## TRUNK CIRCUIT WITH FORCED RELEASE FEATURE

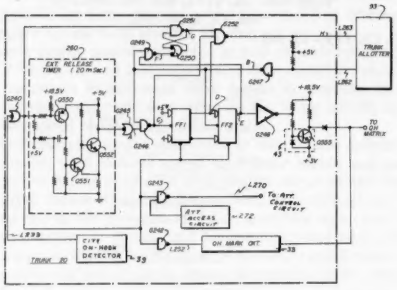
**Jan Synek, Chicago, Ill., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed June 11, 1973, Ser. No. 368,913**

**Int. Cl. H04q** *3/22*

**U.S. Cl. 179—18 F** **4 Claims**

1. In a telephone system having one exchange employing a switching network of the end-marked type, and including a trunk circuit for completing and maintaining a talking path from a local station at said one exchange through the network at said one exchange and from said trunk circuit ot a station at another exchange of said system, and in which means representing said local station provides a first holding voltage for the path through the network and the trunk circuit provides a second holding voltage for the path through said network, the invention comprising means responsive to the station at the other exchange going on-hook for releasing the second holding voltage, means for substituting a temporary holding voltage for said second holding voltage to maintain the path through the network for a timed period, and means operative at the conclusion of said timed period for releasing said other




temporary holding voltage to release said path through said switching network and for releasing said trunk circuit regardless of the on-hook, off-hook condition of said local station.

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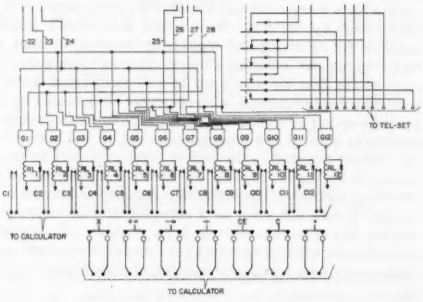
## 3,865,994
## COMBINATION TELEPHONE AND CALCULATOR

**Bernard A. Bender, P.O. Box 361, Cherry Hill, N.J. 08002**

**Filed July 30, 1973, Ser. No. 383,915**

**Int. Cl. H04m** *1/50*

**U.S. Cl. 179—90 K** **2 Claims**




1. In a communications device such as a telephone including a housing, input-output lines, a numeric keyboard providing seven separate outputs as inputs to a dual tone generator to create 12 separate tone pairs, the improvement permitting dual use of the telephone keyboard for tone dialing and as an input to a calculator comprising:

an electronic calculator positioned within the telephone housing and including numeric inputs from zero to nine plus function inputs;

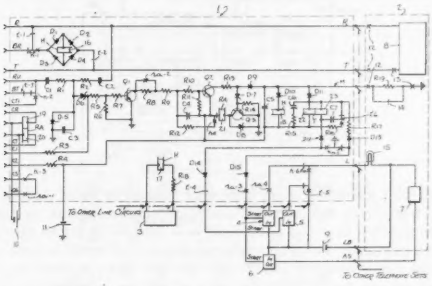
switch means disengaging the seven outputs of the keyboard from the tone generators and providing the seven separate outputs as inputs to a decoding matrix; and

a decoding matrix for decoding the seven outputs into twelve outputs representative of the numeric keyboard designations and applying the decoded outputs as inputs to the calculator.

## 3,865,995
## UNIVERSAL SUBSCRIBER'S LINE CIRCUIT IN A KEY TELEPHONE SYSTEM

**Stephen Kerman, Merrick, N.Y., and Tsuyoshi Shinoi, Kawasaki, Japan, assignors to Nippon Tsu Shin Kogyo K.K., Kawasaki-shi, Japan and TIE/Communications Inc., Stamford, Conn.**

**Filed Mar. 14, 1973, Ser. No. 341,209**
**Int. Cl. H04m** *1/00*
**U.S. Cl. 179—99** **11 Claims**



**5.** A universal line circuit for a key telephone system to connect at least one key telephone set to an office line comprising, in combination,

a normally released relay having first, second and third windings on the core thereof;

means, electrically coupled to said office line and including said first winding, for indicating the presence of ringing current applied to said office line; and

means, electrically coupled to said office line and including the electrical series aiding connection of said second and third windings, for providing an answer monitor signal to the office line, and by means of said connection of said second and third windings, a balanced d-c current supply impedance to the transmission network of said key telephone set.

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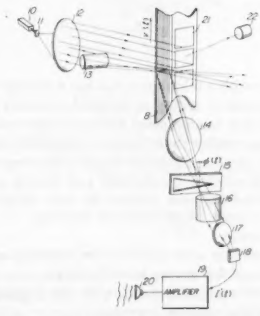
## 3,865,996
## HOLOGRAPHIC AUDIO SIGNAL RECORDING AND PLAYBACK APPARATUS

**Makoto Kato, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed May 8, 1972, Ser. No. 251,298**
**Claims priority, application Japan, May 12, 1971, 46-32075**
**Int. Cl. G11b** *7/18*
**U.S. Cl. 179—100.3 G** **3 Claims**




**1.** An audio signal recording and reproducing system comprising:

recording apparatus comprising means for generating an intermittently interrupted coherent light beam; means for splitting the beam of light from said coherent light generating means and directing one of the split coherent light beams onto a recording medium; means for phase modulating the other of said split coherent light beams with an audio electric signal; and a light blocking member including a slit having a virtually one dimensional opening through which the unmodulated one of said split light beams and the light beam modulated by said modulating means are passed coincidently to cause optical interference therebetween; and

reproducing apparatus comprising means for illuminating with a coherent beam a recording medium on which audio information has been recorded, an area type filter having a wedge-shaped opening for receiving light passed through said recording medium containing said audio information, the amount of light transmitted through said filter depending upon the degree of phase modulation in the beam impinging thereon; photoelectric converting means for receiving light from said filter, said photoelectric converting means converting the light from said filter to an audio signal corresponding to the audio electric signal used for modulating the other of said split coherent light beams; and electroacoustic transducer means for converting the output of said photoelectric converting means to said audio signal.

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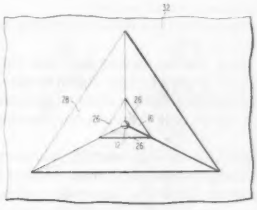
## 3,865,997
## TRIANGULAR PIEZOELECTRIC TRANSDUCER FOR RECORDING VIDEO INFORMATION

**Jerome Barth Halter, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 16, 1973, Ser. No. 351,599**
**Claims priority, application Great Britain, Apr. 19, 1972, 18039/72**
**Int. Cl. G11b** *3/00;* **H04r** *17/04;* **H01v** *7/00*
**U.S. Cl. 179—100.41 P** **14 Claims**



**1.** Apparatus for providing displacement of a cutting stylus in response to electrical signals and adapted for mounting to a bracket comprising:

a pedestal having first and second opposing sides of different surface area;

a cutting stylus;

a stylus mount having a base region and adapted for receiving said cutting stylus;

a piezoelectric element having first and second opposing sides, said first side of said element adjacent to and rigidly coupled to a first side of said pedestal and said second side of said element adjacent to and rigidly coupled to said base region of said stylus mount, said pedestal, piezoelectric element, and stylus mount forming a structure having all external surfaces disposed anti-parallel to each other;

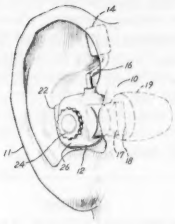
means for providing electrical signals to said piezoelectric element; and

means for mounting said second side of said pedestal on said bracket.

## 3,865,998
## EAR SEAL

**Erwin M. Weiss, Chicago, and Richard Brander, Cicero, both of Ill., assignors to Beltone Electronics Corporation, Chicago, Ill.**

**Division of Ser. No. 94,273, Dec. 2, 1970, Pat. No. 3,783,201.**
**This application June 15, 1973, Ser. No. 370,361**
**Int. Cl. H04r** *25/02*
**U.S. Cl. 179—107 E** **7 Claims**



1. A flexible seal for use in an ear, said ear having an outer ear portion, an ear canal, and an eardrum, comprising, in combination:

a substantially oval outer section;

a curved intermediate section conforming to the bend in said ear canal; and

a tapered inner section having an inner tip, said tapered inner section gradually and continuously tapering from said curved intermediate section to said inner tip, said tip defining a sound outlet directly communicating with said eardrum;

said substantially oval outer section, said curved intermediate section and said tapered inner section fitting entirely within said ear canal and engaging a substantial portion of said ear canal, said substantially oval outer section, said curved intermediate section and said tapered inner section cooperatively defining a channel acoustically linking said outer ear and said ear drum.

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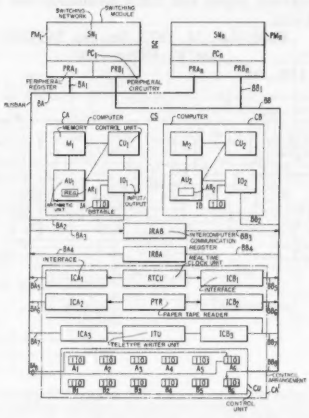
## 3,865,999
## AUTOMATIC TELECOMMUNICATION SWITCHING SYSTEM

**Josef Margaretha Desideer Spitaels, Antwerp, Belgium, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Feb. 26, 1973, Ser. No. 335,531**
**Claims priority, application Netherlands, Feb. 25, 1972, 7202501**
**Int. Cl. H04m** *3/22*
**U.S. Cl. 179—175.2 R** **14 Claims**

1. An automatic telecommunication switching system comprising switching equipment, a control system including two computers adapted to control the establishment and release of call communications through said switching equipment, said control system further including control means cooperative with one of said computers to place said one computer in a standby condition wherein it is prevented from processing new



call communications but is able to execute test operations on said switching equipment.

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## 3,866,000
## TELEPHONE LOCK KIT

**Richard D. Gillis, 23627 Anza Ave., Apt. B, Torrance, Calif. 90505**

**Filed Apr. 27, 1973, Ser. No. 354,989**
**Int. Cl. H04m** *1/66*
**U.S. Cl. 179—189 D** **16 Claims**

1. A kit for use with a telephone that has a casing enclosing a number mechanism including an array of manually operable number elements for manipulation by a user, the area defined by the array being smaller than the area defined by the casing that encloses the number mechanism, and a housing enclosing the casing of the number mechanism and having a window opening larger than the area defined by said array with the array exposed centrally of the window opening,

said kit comprising:

a panel for mounting over said window opening, said panel being apertured for access to said array;

means for connecting the panel with the housing of the telephone at the window opening;

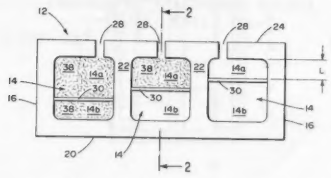
a protective cover for said array to prevent unauthorized access thereto; and

means for releasably engaging the protective cover with said panel and for locking the protective cover to the panel.

## 3,866,001
## STRUCTURAL BLOCK WITH SEPTUM

**Klaus Kleinschmidt, Lexington, Mass., and David Proudfoot, Honolulu, Hawaii, assignors to Miguel C. Junger, Belmont, Mass.**

**Filed Mar. 4, 1974, Ser. No. 447,568**
**Int. Cl. E04b** *1/84*
**U.S. Cl. 181—33 G** **9 Claims**



1. In a block of molded structural material having a cavity and an aperture communicating between the cavity and a source of sound energy, said cavity and aperture forming an acoustical Helmholtz resonator, and said block absorbing the sound energy about a natural resonance frequency in a low frequency range, means for enhancing the sound energy absorption of the block about a secondary resonance frequency in a high frequency range in excess of the low frequency range without detracting from the sound energy absorption in the low frequency range comprising, a septum in a continuous, annular fit with the inner surface of the cavity forming a first cavity volume communicating directly with the aperture and a second cavity volume sealed from the aperture, said septum so structured that it is substantially permeable to sound energy in the low frequency range and substantially impermeable to sound energy in the high frequency range, said second resonance being a function of the first volume.

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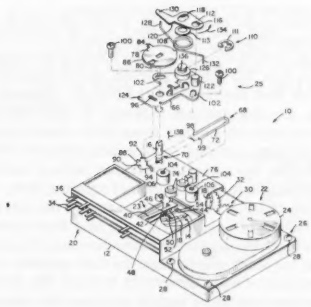
## 3,866,002
## DUAL-FUNCTION LINE SWITCH FOR A CAM-ACTUATED TIMER SWITCH

**David W. Underwood, Clayton, and Benjamin F. Chestnut, Greenwood, both of Ind., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.**

**Filed Oct. 15, 1973, Ser. No. 406,680**
**Int. Cl. H01h** *43/10*
**U.S. Cl. 200—33 R** **7 Claims**



1. In a cam-actuated timer switch having a housing, a cam means having a plurality of independent cam tracks, said cam means being rotatably carried on an axially-indexable cam shaft within said housing, a plurality of contact-carrying switch blades responsive to rotation of said cam means, and an electric motor, carried by said housing means, for driving said cam means, the improvement comprising:

a. a two-position index location means carried by said housing and engaging said cam shaft to provide said cam shaft with two axial index positions in spaced relation to said housing means;

b. ramping means, carried by said housing and coupled to said cam shaft, for moving said cam shaft axially from one of said index positions to the other of said index positions at predetermined angular positions during rotation of said cam shaft;

c. a stop means carried by said housing and coupled to said cam shaft for producing resistance to turning of said cam shaft at a preselected angular position; and

d. a line switch means for switching power to said electric motor in response to said axial movement of said cam shaft and to rotation of one of said independent cam tracks of said cam means.

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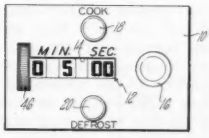
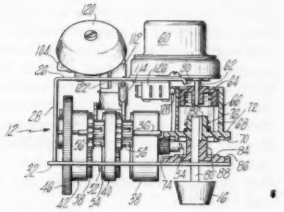
## 3,866,003
## TIMER SWITCH ASSEMBLY CONTROLLING CONTINUOUS AND INTERMITTENT OPERATIONS OF AN OVEN

**William Charles Fox, Plainville, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.**

**Filed Oct. 4, 1973, Ser. No. 403,521**
**Int. Cl. H01h** *43/12*
**U.S. Cl. 200—38 FA** **21 Claims**



1. In a timer device adapted for controlling both continuous and intermittent operation of an electrical appliance, the combination including a manually settable predetermining counter comprising a plurality of number wheels rotatable between a predetermined count readout and a selected count readout, rotary drive means for continuously driving the number wheels from said selected count readout to said predetermined count readout, first electrical appliance control means responsive to counter movement into and out of said predetermined count readout to perform a first control function when the counter is driven out of its predetermined count readout and a second control function upon completion of counter movement toward the predetermined count readout, second electrical appliance control means separate from said first control means for effecting said second and first control functions during movement of the counter between the manually selected count readout and the predetermined count readout and cam means operatively associated with the drive means for repeatedly and intermittently operating said second control means.

**3,866,004**

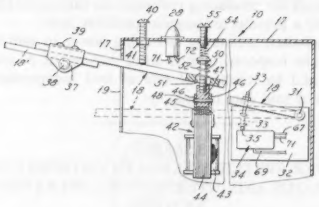
## SAFETY CONTROL DEVICE WITH OBSTRUCTION FEELER AND SWITCH ASSEMBLY

**Norbert Joseph Nawrocki, Grand Rapids, Mich., assignor to F. L. Jacobs Company, Southfield, Mich.**

**Filed July 5, 1973, Ser. No. 376,811**

**Int. Cl. H01h** *3/16*

**U.S. Cl. 200—61.42** **10 Claims**



1. An impact or related type machine comprising a reciprocally movable tool part and an electrical operating circuit including a normally opened first switch and a power relay unit in series with said first switch, said power relay unit when energized effective to initiate movement of said tool part, a second switch interposed in said electrical operating circuit between said first switch and said power relay unit, said second switch having first and second positions, said second switch when in said first position opening said operating circuit between said first switch and said power relay unit, a safety control device governing operation of said electrical operating circuit comprising an elongated control arm pivotally mounted for a motion in which an end portion thereof may fully traverse a danger zone in proximity to the path of reciprocation of said tool part and prior to the reciprocation of said tool part, unless interrupted by a zone obstruction, said control device having an electrical safety circuit interposed in said operating circuit between said first and second switches parallel to said power relay unit, said electrical safety circuit being responsive to a signal initiated upon the closing of said first switch, said safety circuit including electrically responsive means connected to said control arm and when energized upon the closing of said first switch effective to swing said control arm through said danger zone unless the movement thereof is obstructed, said control arm after movement through said danger zone being effective to move said second switch to its second position thereby permitting current to flow through said power relay unit to initiate movement of said tool part.

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**3,866,005**

## ARC ELECTRODE STRUCTURE, ESPECIALLY FOR VACUUM SWITCHES

**Joachim Amsler, Unterentfelden, Switzerland, assignor to Sprecher & Schuh AG, Aaru, Switzerland**

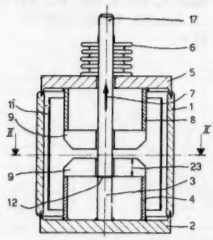
**Continuation-in-part of Ser. No. 232,480, March 3, 1972, Pat. No. 3,773,993. This application May 23, 1973, Ser. No. 363,048**

**Claims priority, application Switzerland, June 22, 1972, 9398/72**

**Int. Cl. H01h** *33/66*

**U.S. Cl. 200—144 B** **9 Claims**

1. An arc electrode arrangement, particularly for vacuum switches comprising two oppositely located electrode assemblies, each electrode assembly including a separation contact and arcing means having an arcing face to take up the base points of the arc, said arcing means comprising a plurality of plates separated from one another by gaps therebetween, said plates extending substantially parallel to the axis of the respective separation contact, the width of said gaps being at least equal to the thickness of a plate, the edges of the plates defining said arcing face, means rigidly connecting the plates of each respective electrode assembly directly with the respective separation contact in electrically conductive fashion, said plates being so arranged in the electrode assemblies that upon



closed contact the plates of one of the electrodes assembly are not in direct contact with the plates of the other electrode assembly, said separation contact having a contact surface projecting beyond the narrow end surfaces of said plates towards the other electrode assembly.

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**3,866,006**

## PUSHBUTTON SWITCH WITH RECIPROCATING CAM

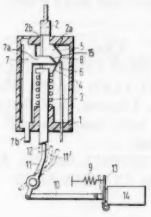
**Werner Westram, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany**

**Filed Aug. 17, 1973, Ser. No. 389,343**

**Claims priority, application Germany, Aug. 23, 1972, 2241346**

**Int. Cl. H01h** *13/52*

**U.S. Cl. 200—153 LA** **10 Claims**



1. A pushbutton switch for use in keyboards which are utilized in typewriters and telex machines, said switch comprising a housing, a shaft mounted in the housing for reciprocation between a first and second position, means biasing the shaft towards the first position, a fixed contact mounted in said housing, a movable contact mounted in said housing, means biasing said movable contact towards the fixed contact, said shaft having a first operating surface inclined to the direction of reciprocation and a second operating surface inclined in an opposite direction to the direction of reciprocation, said first surface being disposed on the shaft to engage the movable contact to hold it out of engagement with said fixed contact and to move the movable contact in a direction away from the fixed contact as the shaft moves from the first position to an intermediate position during movement towards the second position, said second operating surface engaging the movable contact when the shaft reaches the intermediate position to enable the means biasing the movable contact to urge the movable contact along the second operating surface and into contact with the fixed contact as the shaft moves from the intermediate position towards the second position, whereby initial movement of the shaft between the first position through the intermediate position is opposed by both biasing means and subsequent movement from the intermediate posi-

tion towards the second position is aided by the biasing means acting on the movable contact.

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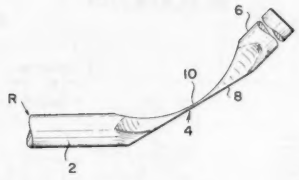
**3,866,007**

## CONTACT REED WITH FOIL-THIN INTERMEDIATE SECTION

**Bernard Edward Shlesinger, Jr., 9411 Macklin Ct., Alexandria, Va. 22309, and Charlie D. Mariner, 121 Garrison St., Bolling Air Force Base, Washington, D.C. 20336**

**Filed Oct. 9, 1973, Ser. No. 404,612**
**Int. Cl. H01h** *1/26*
**U.S. Cl. 200—283** **62 Claims**




1. A reed for a reed switch comprising:
a. a body of conductive material having a contact section, an intermediate spring section, and a support section,
b. said intermediate section being foil-thin and having a cross sectional thickness of less than 0.003 inch,
c. said support section being substantially rigid and non-flexible,
d. said contact section being substantially thicker than said intermediate section,
e. said intermediate section comprising a leaf spring having a flexibility permitting one end of said leaf spring to flex a substantial distance through an arc of at least 25° with respect to the other end of said leaf spring without exceeding the elastic limits of said spring,
f. said intermediate section being cold-worked to a point where said conductive material assumes a substantial change in physical characteristics, and
g. said intermediate section being substantially harder, less ductile, and more dense than said contact section and having a substantially higher tensile strength than said contact section.

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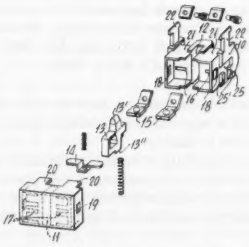
**3,866,008**

## COMPOSABLE SWITCH DEVICE

**Angelo Teruzzi, Via Volta 7A, Milan, Italy**

**Filed Jan. 16, 1974, Ser. No. 434,906**
**Claims priority, application Italy, Jan. 29, 1973, 19740/73**
**Int. Cl. H02b** *1/08;* **H05k** *5/00;* **H01h** *9/08*
**U.S. Cl. 200—303** **11 Claims**



1. A press type of switch device comprising a hollow body containing the electrical contact element of the switch, for association with a control member, wheren said body is formed of two snap interassociable parts, of which a first part is for carrying the fixed contacts and the second part is a side closure part, said first body part defining a central longitudinal guide open at both ends for a slider carrying the movable contacts of said contact elements, said first body part having at one end two resiliently yieldable opposite legs for snap engaging in corresponding seats provided on said control member; the switch body also having corresponding seats in aligned relationship with said legs and formed at the opposite end of the switch body for enabling two or more switch devices to be interassociated with the slider aligned for a common drive.

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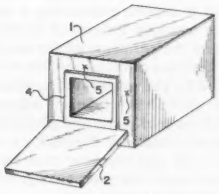
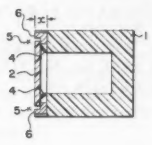
**3,866,009**

## SEAL MEANS FOR PREVENTING THE LEAKAGE OF MICROWAVE ENERGY FROM MICROWAVE HEATING OVEN

**Takeshi Ishino, and Nobuyuki Ono, both of Nikaho-machi, Japan, assignors to TDK Electronics Company Ltd., Chiyoda-ku, Tokyo, Japan**

**Continuation of Ser. No. 259,755, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 48,137, June 22, 1970, Pat. No. 3,742,176. This application Nov. 21, 1973, Ser. No. 418,047**
**Claims priority, application Japan, June 26, 1969, 44-50870; Jan. 21, 1970, 45-5098**
**Int. Cl. H05b** *9/06*
**U.S. Cl. 219—10.55 D** **6 Claims**




1. A microwave oven comprising a body formed by walls and having an opening in one of said walls; a door provided for closing said opening; said body and said door in a closed position defining a path through which microwave energy may leak from the inside to the outside of said oven; and leakage prevention means comprising a volumetric resonant cavity in one surface of said path, and a layer of ferromagnetic material located directly along one surface defining said path and spaced from said cavity, the layer of ferromagnetic material incompletely blocking the opening of said path and having a surface exposed to said path, said surface of said ferromagnetic material and opposed surface of said path forming a gap therebetween, said ferromagnetic material consisting of a mixture of the powder of ferrite and an organic high molecular weight compound, said ferrite having the formula:

$$MFe_2O_4$$

wherein M is a divalent metal such as Ni, Cu, Zn, Mn or Mg, and said high molecular weight compound being selected from the group consisting of natural rubber and synthetic rubber,

the thickness of the gap being in the order of from approximately 5 percent to 50 percent of the thickness of the layer of ferromagnetic material.

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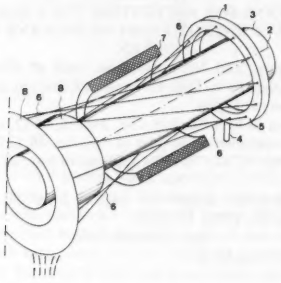
**3,866,010**

## WATER JET DEVICE FOR INDUCTION HEATERS

**Michel Cuvelier, Liege, Belgium, assignor to Elphiac, Brussels, Belgium**

**Filed Nov. 27, 1973, Ser. No. 419,366**
**Claims priority, application Belgium, Nov. 27, 1972, 4615**
**Int. Cl. H05b** *5/08*
**U.S. Cl. 219—10.57** **2 Claims**



**1.** A jet device surrounding a passage way, wherein an article to be heated is moved, comprising a ring extending around said passage way and a series of nozzles distributed along a base circle on the periphery of the ring for directing jets of water in the direction of their axes, the axis of each said nozzle being inclined by the same predetermined angle with respect to the plane of the base circle and being tangent to a neck circle spaced from said plane and perpendicular to the radius of the point of contact on the neck circle, said neck circle being coaxial with and narrower than said base circle and coaxial with and wider than said passage way and being located inside an induction heating coil.

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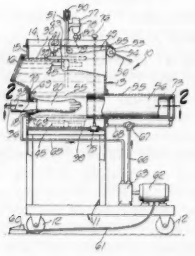
**3,866,011**

## INSTRUCTIONAL APPARATUS FOR UNDERWATER WELDING

**Edgar C. Cole, 724 B St., Taft, Calif. 93268**

**Filed July 9, 1973, Ser. No. 377,640**
**Int. Cl. G23k** *9/00*
**U.S. Cl. 219—72** **25 Claims**



**15.** Instruction apparatus for use in gaining experience in underwater electric welding comprising: a water tank in direct communication with the atmosphere and normally charged with water to provide a welding station submerged in water, a flooded viewing window in the sidewall of said tank opposite said welding station, a hand manipulatable welding rod holder and electric service cord therefor, and a pair of rubber gloves having the inlet ends thereof sealed to openings through normally flooded openings in the tank wall adjacent said viewing window.

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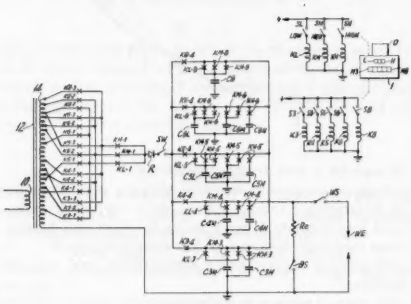
**3,866,012**

## METHOD AND APPARATUS FOR ELECTRICAL STUD WELDING

**Dankmar Tauern, Triesenberg; Rainer Wild, Schaan, and Karl-Max Harder, Vaduz, all of Liechtenstein, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein**

**Filed June 29, 1973, Ser. No. 374,965**
**Claims priority, application Germany, June 30, 1972, 2232269**
**Int. Cl. B23k** *11/24*
**U.S. Cl. 219—99** **20 Claims**



**1.** An electrical stud welding apparatus for use with bolts having different cross-section bolt welding areas, comprising capacitor means variable in capacitance value, voltage means variable in voltage for applying a voltage across said capacitor means, discharge means for discharging said capacitor means through the welding area, switch means having a plurality of manually actuable switches each correlated to one of a plurality of normal operating capacitance charging voltages in said voltage means and capacitance values in said capacitor means, said switch means being coupled to said voltage means and said capacitor means for simultaneously selecting a single capacitance charging voltage and a single capacitance value for each of said switches, each of said charging voltages and capacitance values being appropriate to a selected cross sectional area of a bolt to be welded, the selection of each of the selected one of the plurality of charging voltages and each of the selected ones of the capacitance values being settable simultaneously by a single one of said switches.

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**3,866,013**

## METHOD AND APPARATUS FOR CONTROLLING MOVABLE MEANS SUCH AS AN ELECTRON BEAM

**Philip M. Ryan, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

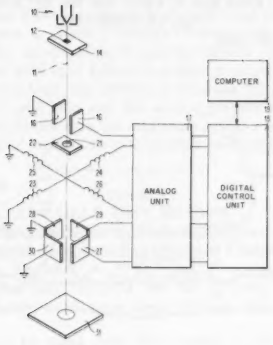
**Filed Sept. 19, 1973, Ser. No. 398,734**
**Int. Cl. B23k** *15/00*
**U.S. Cl. 219—121 EM** **35 Claims**

**1.** A method of positioning means movable in a line by line pattern at each of a plurality of predetermined positions along each of the lines including:

selectively controlling at least one function of the movable means at each of the predetermined positions on the line in accordance with information from a memory for each of the plurality of the predetermined positions along the line;

determining if the function at the same predetermined position in the next line is different than in the line along which the movable means is moving prior to the movable means being moved from the predetermined position;

and changing the information in the memory for the same predetermined position in the next line prior to the movable means being moved from the predetermined position if it is determined that the function is different.

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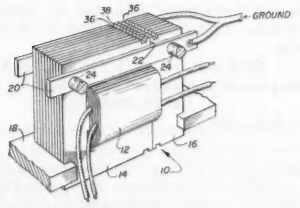
**3,866,014**

## METHOD OF WELDING LAMINATED CORES

**Earl C. Waller, Redwood Township, Richland County, Wis., assignor to Advance Transformer Co., Chicago, Ill.**

**Filed May 11, 1973, Ser. No. 359,373**
**Int. Cl. H02k** *1/06*; **B23k** *9/00*
**U.S. Cl. 219—137** **10 Claims**




**1.** A method of welding laminated cores of electromagnetic devices in which there are at least two core parts each formed of a separate stack of laminations, such parts having abutting faces forming interior connections having exterior seams, said method comprising stamping the laminations forming such parts with respective notches on opposite lateral edges, such notches each being spaced from the edge of the lamination which is to form a portion of an abutting face whereby to provide, when the laminations are stacked to form said parts, approximately half of a central projection with a contiguous parallel groove on each part at the edges to be abutted, assembling the laminated core by bringing the stacks into engagement with their opposed faces abutted to form a common connection and the part projections joining to form a full projection, the seams being located in the projection and joining after assembly to form a common seam, holding the electromagnetic device in assembly while connected to the ground terminal of welding apparatus, and passing the welding electrode of the welding apparatus along the common projection to cause the electric arc to pass through the projection closing the common seam with weldment.

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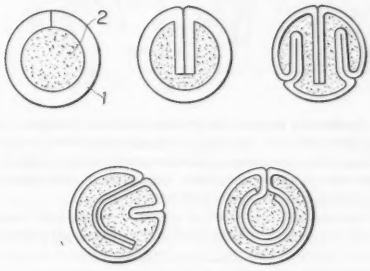
**3,866,015**

## FLUX-CORED ELECTRODE WIRE FOR NON-SHEILDED ARC WELDING

**Tadashi Matsumoto, Kanagawa-ken, and Takashi Yoshida, Tokyo, both of Japan, assignors to Nippon Steel Corporation, Chiyoda-ku, Tokyo, Japan**

**Filed Dec. 28, 1973, Ser. No. 429,199**
**Claims priority, application Japan, Dec. 29, 1972, 47-3952; Feb. 26, 1973, 48-22989**
**Int. Cl. B23k** *35/22*
**U.S. Cl. 219—146** **2 Claims**




**1.** A flux-cored electrode wire for non-shielded arc welding with a powder flux filled in a hoop case, in which said powder flux comprises 20–70 percent of metal fluoride containing 1–30% of $CeF_2$, LiF or combinations thereof, and 0.5–10 percent of a complex metal fluoride, 1–20 percent of a metal carbonate, 10–30% of Al—Mg alloy containing 30–60% of Al in powder form and 5–40 percent of a metal powder other than Al—Mg, the Si content in said flux being less than 2 percent, and the weight of flux to the total weight of the wire being 10–40 percent.

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**3,866,016**

## ELECTRICALLY HEATED FABRIC WALL COVERING ASSEMBLY

**Gerard Tombu, Rue des Bouchers 8, 02 St. Quentin, France**

**Filed Mar. 5, 1973, Ser. No. 338,277**
**Claims priority, application Belgium, Mar. 10, 1972, 78046**
**Int. Cl. H05b** *3/34*; **E04b** *2/00*
**U.S. Cl. 219—213** **6 Claims**

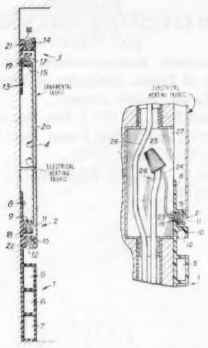
**1.** A heated fabric wall covering assembly comprising:

a. a heating fabric having opposite edges and including conductive electric heating means having opposite ends extending to said opposite fabric edges;

b. at least a pair of non-conductive hooking-on elements for mounting said fabric to a wall, said hooking-on elements being fixed to a wall in spaced-apart relationship;

c. each of said hooking-on elements further including a hollow rib;

d. a conductive insert in each of said hollow ribs, each insert being connected to one side of an electrical supply main;
e. the opposite edges of said fabric being inserted within the hollow ribs of said hooking-on elements, with at least a portion of said conductive heating means being in electrically conductive engagement with said inserts;



f. conductive keeper strips inserted and retained in said hollow ribs for securing each opposite fabric edge to its respective hooking-on element, said keeper strips being in electrically conductive engagement with the entire heating means within said hollow ribs;
g. whereby the said heating means is maintained in electrical conductive relationship with said supply main.

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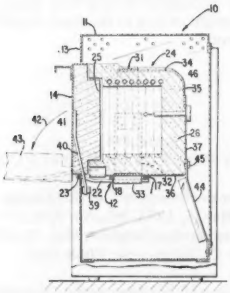
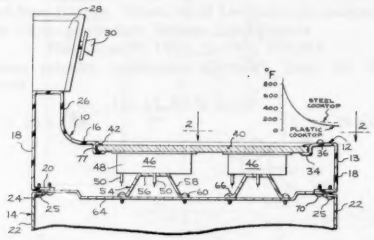
**3,866,017**
**BOX FURNACE**
**William M. Keren, and Peter J. Loniello, both of Watertown, Wis., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.**
**Filed Mar. 7, 1974, Ser. No. 449,092**
**Int. Cl. F27b** *5/14*; **F27d** *11/02*
**U.S. Cl. 219—390** **5 Claims**



**1.** In an industrial furnace, the combination of an outer shell, a furnace heating unit supporting metal frame within said shell, and a heating unit of a ceramic insulating material having electrical heating elements and mounting metal band means molded in situ therewith and embedded therein, said heating unit being mounted upon said frame and secured in position by said mounting band means.

**3,866,018**
**MOLDED PLASTIC COOKTOP WITH HEATED GLASS-CERAMIC PLATE INSERT**
**Bohdan Hurko, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**
**Filed Apr. 1, 1974, Ser. No. 457,078**
**Int. Cl. H05b** *3/68*
**U.S. Cl. 219—460** **5 Claims**



**1.** A heated cooktop comprising a glass-ceramic plate that is furnished with at least one electric surface heating means, a support means for the glass-ceramic plate in the form of a housing of polymeric resinous material of thin stock, the said housing having a top opening in which the glass-ceramic plate is inserted as a flush mount to form an integral part of the housing, the said housing being of shallow box-like configuration having a top surface, a plurality of shallow vertical side walls extending downwardly therefrom, the surface heating means having support means that include a rigid plate positioned adjacent the bottom of the housing and attached to certain of said side walls, whereby the housing creates a large temperature drop from the edge of the glass-ceramic plate to the outer edge of the cooktop.

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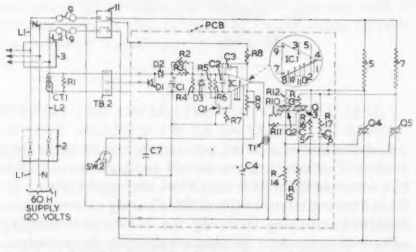
**3,866,019**
**ELECTRICAL CONTROL CIRCUIT**
**Jean-Pierre Cartier, 279 Chemin-Dubois, Tiedmont; David Winn, 348 Notre Dame, East, Apt. 1C, Montreal, Quebec, and Anthony L. Stelmach, 56 Brunet St., Point Claire, all of Canada**
**Filed Sept. 10, 1973, Ser. No. 395,835**
**Claims priority, application Canada, Sept. 14, 1972, 151704**
**Int. Cl. H05b** *1/02*
**U.S. Cl. 219—485** **10 Claims**



**1.** An electrical load monitoring and switching system comprising:
a. total load measuring means arranged to monitor an electrical supply;
b. switch means connectible to control the supply of electrical power from said supply to partial load means forming a substantial part of a total load, but not forming the total load; and
c. control means arranged to transfer the switch means between a closed condition in which said partial load means are energised as part of said total load from said

supply, and an open condition in which said partial load means are no longer so energised; the control means being arranged to receive an input signal from said total load measuring means and to cause transfer of the switch means between the closed condition and the open condition when a first predetermined total load is exceeded; and further to effect a transfer of the switch means between the open condition and the closed position only when the total load falls to less than a second predetermined total load, the difference between the first predetermined total load and the second predetermined total load being larger than the maximum power which the said partial load means can extract from said supply.

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**3,866,020**

## BRAILLE TAPE READER

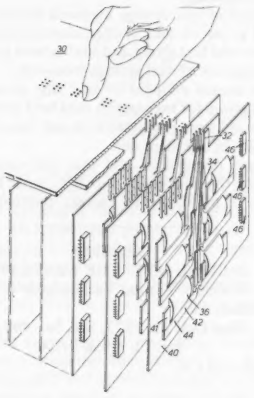
**David Valentine Charlesworth, Seaford, England, assignor to Clarke & Smith Manufacturing Company Limited, Wallington, Surrey, England**

**Filed July 10, 1973, Ser. No. 377,960**

**Claims priority, application Great Britain, July 11, 1972, 32284/72**

**Int. Cl. G06k** *7/08, 9/00;* **G09b** *21/00*

**U.S. Cl. 235—61.11 D** **6 Claims**



1. Tactile script presentation apparatus comprising:

a. read-out means for receiving a data storage medium on which data is stored identifying groups of characters to be presented and operable to read-out said data;

b. data storage means capable of receiving and storing data representing a complete group of characters;

c. manual control means operable to cause rapid read-out from said read-out means of data representing one complete group of characters at a time for supply to said data storage means; and

d. tactile presentation means controlled by the data in said data storage means for presenting simultaneously in tactile script a stationary array of all of the characters of the group represented by the data stored in said data storage means, whereby said characters can be selected for presentation group by group one complete group at a time, said tactile presentation means comprising

1. a stationary finger plate containing a row of cells each consisting of a plurality of apertures;

2. a plurality of pins associated with said apertures, respectively, each of said pins being arranged normal to said finger plate for movement between a normal withdrawn position in which the pin is withdrawn from the finger plate and an inserted position in which one end of the pin extends through the associated aperture and projects from the surface of the finger plate; and

3. displacement means for axially displacing selected ones of said pins from the withdrawn position to the inserted position, thereby to present selected characters for reading by feeling the selected pins.

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**3,866,021**

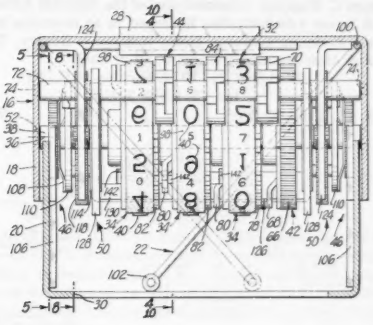
## ELAPSED EVENT RECORDER

**Stanley Kessler, 9317 Maryknoll, Whittier, Calif. 90605**

**Continuation-in-part of Ser. No. 075,375, Sept. 25, 1970, abandoned. This application Nov. 6, 1972, Ser. No. 304,277**

**Int. Cl. G06m** *3/06*

**U.S. Cl. 235—92 EA** **27 Claims**



1. An elapsed event recorder for counting a series of reoccurring events during random counting intervals and at the end of each counting interval stamping on a record card indicia representing the number of events occurring during the interval, said recorder having separating recording and driving units and comprising:

a housing having a printout opening,

a count accumulating register within said housing including a set of rotary marking wheels disposed side by side on a common axis, and means supporting said wheels in said housing for rotation on said axis,

each wheel being rotatable through a number of successive counting positions and having marking elements spaced about its circumference in a manner such that the marking elements on the several wheels are aligned in rows parallel to said axis when said wheels occupy counting positions,

input means drivably coupled to one end wheel of said wheel set for stepping said end wheel from one position to the next in reponse to occurrence of each event to be recorded, said input means comprising a rotary input member, means drivably connecting said input member and said end wheel for stepping the latter wheel through its positions in response to rotation of said input member, and a motor for driving said input member,

driving means connecting the adjacent wheels in a manner such that each wheel other than said end wheel is stepped from one position to the next in response to each full revolution of the adjacent wheel in the direction of said end wheel,

actuating means for effecting relative movement of said register away from said opening to a normal recording position in said housing and toward said opening to a marking position wherein a row of marking elements on said wheels are disposed within said opening for contact with a record card positioned opposite the opening,

said elements being arranged to stamp on said record card indicia representing the current accumulated event count in response to movement of said register to marking position,

said recording unit including said housing, register, input means, driving means, actuating means, and zero return means,

said driving unit including a housing containing said motor, a rotary driving member driven by said motor, and means in said driving unit housing for receiving said recording unit in driving position wherein said input member engages and is driven by said driving member, and

said recording unit being removed from said driving unit to stamp said record card.

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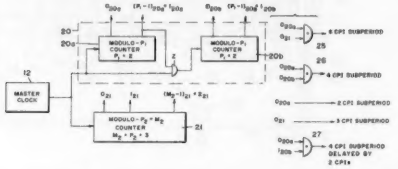
## 3,866,022
## SYSTEM FOR GENERATING TIMING AND CONTROL SIGNALS

**James C. Fletcher, Administrator of the National Aeronautics & Space Administration in respect to an invention by; Marvin Perlman, Granada Hills; William J. Rousey, Tujunga, and Alan Messner, Monrovia, all of Calif.**

**Filed Dec. 26, 1972, Ser. No. 319,150**
**Int. Cl. H03k** *21/36*
**U.S. Cl. 235—92 DM** **9 Claims**


MODULO-$P_1$ COUNTER $P_1 = 5$
MODULO-$P_2$ COUNTER $P_2 = 2$
MASTER CLOCK
MODULO-$P_3 * M_2$ COUNTER $M_2 * P_3 = 3$
6 CPI SUBPERIOD
4 CPI SUBPERIOD
2 CPI SUBPERIOD
3 CPI SUBPERIOD
4 CPI SUBPERIOD DELAYED BY 2 CPIs

1. A system comprising:

clock means for providing a succession of clock pulses of equal clock pulse intervals, each sequence of $M$ clock pulse intervals defining a data frame, $M$ being an integer other than a distinct prime and not less than one thousand;

a plurality of modulo-$m_i$ multistage counters where each $m_i$ is a different prime power divisor of M, each modulo-$m_i$ counter comprising a different cascade of $\alpha$ modulo-$p_i$ counters, where $p_i$ in each cascade is the same and is a different distinct prime of M and $\alpha_i$ in each cascade is an integer not less than 1, with at least one $\alpha_i$ being greater than 1 and each $m_i = p_i$ ;

means for coupling said counters to said clock means for clocking said modulo-$m_i$ counters in parallel with said clock pulses, with the first counter in each cascade being clocked directly with each clock pulse and each succeeding counter in a cascade is clocked by a clock pulse only when the preceding counter in a cascade changes from a last state in its state cycle to a first state in its cycle whereby each modulo-$p_i$ counter cycles through a cycle of $p_i$ states and the combined states of the $\alpha_i$ counters forming each modulo-$m_i$ counter represent different states of a state cycle of $m_i$ states; and

logic means coupled to selected ones of said counters for providing a plurality of subperiods of said data frame as a function of the states of the counters to which it is coupled, each subperiod being a sequence of output pulses, each with an output pulse interval which is equal to the clock pulse interval times a different factor definable as $X_i$, where $X_i$ is an integer and a factor of $M$ and wherein the smallest value of $X_i$ is equal to the smallest distinct prime of $M$, said subperiods including one delayed subperiod whose first output pulse is delayed by an interval from the start of said data frame, which is not less than one clock pulse interval and not greater than $Y$ clock pulse intervals, where $Y$ $X_i - 1$.

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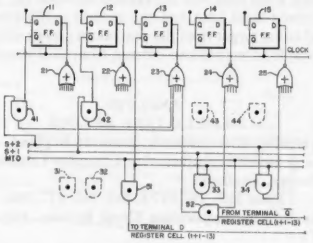
## 3,866,023
## APPARATUS AND METHOD FOR BIDIRECTIONAL SHIFT REGISTER OPERATION

**Virendra K. Kadakia, Los Angeles, Calif., assignor to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed Dec. 29, 1971, Ser. No. 215,965**
**Int. Cl. H03k** *21/06*
**U.S. Cl. 235—92 SH** **12 Claims**




1. Apparatus for bi-directional shifting of data in storage elements comprising:

a first group of said storage elements ordered serially;

a second group of said storage elements ordered serially, wherein said first group and said second group contain an equal number of said storage elements;

exchange means coupled to said first group and to said second group for exchanging data held in a corresponding one of said storage elements of said second groups automatically in one step; and

shift means coupled to said first and second groups for changing the position of data held in each of said groups relative to the respective storage elements thereof.

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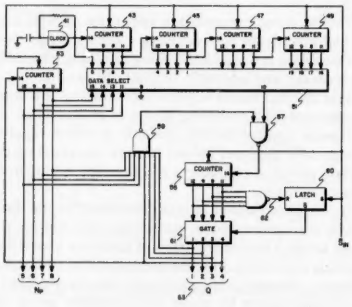
## 3,866,024
## DIGITAL LOG-TIME GENERATOR

**Richard E. Williams, Reston, Va., assignor to Scope Incorporated, Reston, Va.**

**Filed Oct. 23, 1973, Ser. No. 408,616**
**Int. Cl. H03k** *21/06*
**U.S. Cl. 235—92 CC** **5 Claims**




1. A digital log-time generator comprising

binary counter means having multiple taps, each of said taps carrying a rate of one-half of that of the preceding tap;

clock means for supplying pulses of a predetermined frequency to said binary counter;

means for selecting one of said taps and counting the pulse output therefrom;

means for advancing the selecting means to the succeeding one of said taps after said count is completed;

means for supplying an activating signal to said generator; and

means for constraining the output of said generator to a value of zero for a predetermined period of time after the application of said activating signal.

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## 3,866,025
## SPACECRAFT ATTITUDE CONTROL SYSTEM

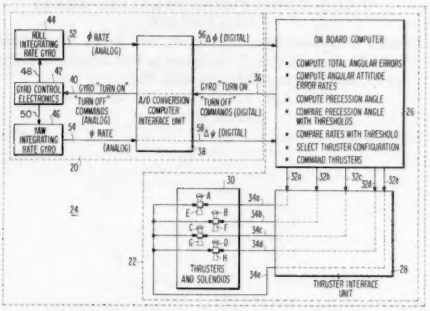
**John Denis Cavanagh, Ardmore, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 15, 1973, Ser. No. 341,775**

**Claims priority, application Great Britain, Mar. 17, 1972, 12698/72**

**Int. Cl. G05d** *1/10*

**U.S. Cl. 235—150.2** **18 Claims**




1. A thruster control system for a spacecraft comprising:

a. a plurality of body-mounted orbit adjust thrusters adapted to develop a thrust along a given axis of said spacecraft when operated jointly to thereby change the orbit of said spacecraft and to develop a torque when less then all said thrusters are operated,

b. attitude sensing means for determining the attitude of said spacecraft relative to a reference to generate error signals,

c. an on-board computer for controlling the operation of said thrusters, said computer comprising

c1. means responsive to a command signal for operating all said thrusters to develop a thrust of said spacecraft thereby to change the orbit of said spacecraft, and

c2. means responsive to said attitude error signals to inhibit a selected number of said thrusters while the orbit of said spacecraft is being changed to develop a torque to correct the attitude of said spacecraft.

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## 3,866,026
## ENTHALPY CALCULATING DEVICE FOR STEAM

**Dominique le Febve de Vivy, Winterthur, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland**

**Filed Dec. 19, 1973, Ser. No. 426,055**

**Claims priority, application Switzerland, Dec. 20, 1972, 18597/72**

**Int. Cl. G06g** *7/57*

**U.S. Cl. 235—151.1** **16 Claims**

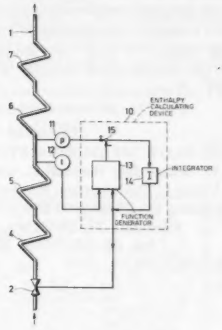
1. An enthalpy-calculating device for calculating the enthalpy of steam including

a function generator for receiving a first input signal corresponding to the magnitude of the temperature of the steam and a second input signal corresponding to the magnitude of the enthalpy of the steam, and for emitting an output signal corresponding to the determined magnitude of the pressure of the steam in response to said input signals;

a first input terminal for receiving said first input signal for emission to said function generator;

a second input terminal for receiving an output signal corresponding to the magnitude of the pressure of the monitored steam; and

a controller means connected to said second input terminal to receive said input signal therefrom and to said function




generator to receive the emitter output signal thereof for comparing said respective signals, said controller means having an output terminal for emitting said second input signal in response to a comparison of said respective signals to said function generator and to an output terminal of said device.

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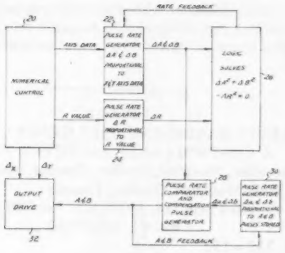
## 3,866,027
## DIGITAL TOOL SIZE COMPENSATION FOR NUMERICAL CONTROL

**Hymie Cutler, Detroit, and Donald Vadasy, Southgate both of Mich., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed May 9, 1973, Ser. No. 358,768**

**Int. Cl. G06f** *15/46*

**U.S. Cl. 235—151.11** **21 Claims**




1. In a numerically controlled machine having computing and storage means, operative to control the movement of a cutter tool to thereby machine an article in response to a segmented profile program defined with respect to at least two perpendicular coordinate axes, each segment of said program including a block of digital data for each axis, each block of data being individually indicative of the profile along one of said coordinate axes, and wherein said computing and storage means converts said data blocks into sets of control pulses operative to actuate output drives individually associated with each coordinate axes to control the relationship between said cutter tool and said article; a system for providing compensation for the size of said cutter tool comprising:

means for inserting information relating to size of said cutter tool into said numerically controlled machine,

means responsive to said information relating to the size of said cutter for generating a radius pulse proportional to said information;

means responsive to said radius pulse rate and said blocks of digital data for generating at least two offset pulse rates having a predetermined relationship to said radius pulse rates and said profile segment; and

means responsive to said two offset pulse rates for generating compensation pulses operative to offset said output drives thereby compensating for the size of said cutter tool.

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**3,866,028**

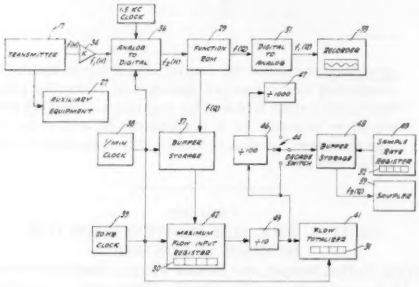
**FLUID FLOW MEASURING SYSTEM AND METHOD**

**James G. Schontzler; Wendall C. Gates, both of Santa Cruz, and Victor L. DaGragnano, Redwood, all of Calif., assignors to Manning Environmental Corp., Santa Cruz, Calif.**

**Filed July 27, 1973, Ser. No. 383,269**

**Int. Cl. G01f** *1/00*; **G06f** *9/00*

**U.S. Cl. 235—151.34** **12 Claims**



1. A total flow measuring system for liquid flow through a channel having a predetermined cross section shape comprising means for detecting a fluid surface level in the channel, means for providing a signal related to fluid surface level relative to a predetermined reference level, computer means for receiving said signal related to surface level and converting said signal to a digital signal, and program means for receiving said digital signal and providing output indicative of total flow volume.

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**3,866,029**

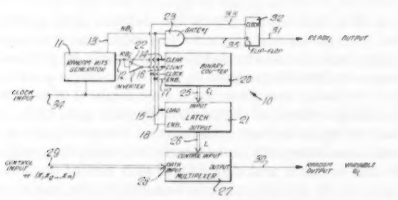
**TWO LEVEL RANDOM NUMBER GENERATOR HAVING A CONTROLLABLE EXPECTED VALUE**

**Paul Chevalier, Montreal, Quebec, Canada, assignor to Prayfel Inc., West Montreal, Quebec, Canada**

**Filed Sept. 18, 1973, Ser. No. 398,409**

**Int. Cl. G06f** *7/60*

**U.S. Cl. 235—152** **6 Claims**



1. A random number generator for generating a sequence of binary random numbers ($S_i$) whose expected value is controlled by an input digital number $x$, comprising:

a random bit generator which generates at one output a sequence of mutually independent random variables ($RB_i$) such that the probability $P(RB_i=0) = P(RB_i=1) = \frac{1}{2}$,

means to sequentially analyse the sequence of random variables ($RB_i$) and generate a random variable $L_i$ which has a probability function given by:

$$P(L_i = k) = 2^{-k} \text{ where } k = 1, 2, 3 \ldots$$

each time a pattern of the form ( **1,000 . . . 01**) containing (k-**1**) zero is detected, and

means to set the output random variable $S_i$ of said random number generator equal to the bit $X_k$ of $x$ whenever the random variable $L_i$ is equal to $k$, and this for $k = 1, 2, 3, \ldots$.

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**3,866,030**

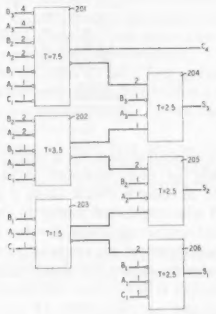
**TWO'S COMPLEMENT PARALLEL ARRAY MULTIPLIER**

**Charles Richmond Baugh, Lincroft, and Bruce Allen Wooley, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Apr. 1, 1974, Ser. No. 457,079**

**Int. Cl. G06f** *7/39*

**U.S. Cl. 235—164** **14 Claims**



1. Apparatus for forming the product, $P = (p_{n+m-1}, p_{m+n-2}, \ldots, p_0)$, of an $m$-bit 2's complement multiplicand, $Y = (y_{m-1}, y_{m-2}, \ldots, y_0)$, and an $n$-bit 2's complement multiplier, $X = (x_{n-1}, x_{n-2}, \ldots, x_0)$, comprising

A. first means for forming partial product terms $x_i y_j$ for all $i$ and $j$ yielding positive values,

B. second means for forming partial product terms having positive values equivalent to those $x_i y_j$ which are negative, and

C. third means for combining said partial product terms formed by said first and second means to form said product P.

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**3,866,031**

**ANALOGUE FUNCTION GENERATOR**

**Ferdinand Konig, Seuzach, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland**

**Filed Dec. 19, 1973, Ser. No. 426,115**

**Claims priority, application Switzerland, Dec. 20, 1972, 18598/72**

**Int. Cl. G06g** *7/26*

**U.S. Cl. 235—197** **5 Claims**

1. An analogue function generator for generating a function of the form

$$z = a_{00} + a_{01}x + a_{02}x^2 + a_{03}x^3 \ldots + a_{0m}x^m + (a_{10} + a_{11}x + a_{12}x^2 \ldots + a_{1m}x^m) \cdot Y + (a_{20} + a_{21}x + \ldots + a_{2m}x^m) \cdot Y^2$$

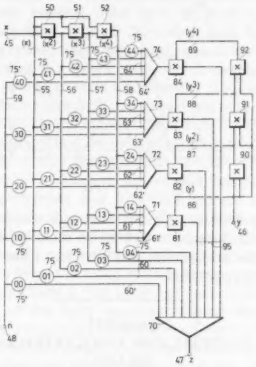
$+ (a_{n0} + a_{n1}x + a_{n2}x^2 \ldots + a_{nm}x^m) \cdot Y^n$,

wherein $m$ and $n$ are both greater than 1, comprising

means for generating signals representing $x^2$, $x^3$ . . . and $x^m$,

$(m + 1)$ signal lines each arranged to carry respectively a reference signal and the signals representing $x$, $x^2$, $x^3$ . . . and $x^m$,

$(m + 1) \cdot (n + 1)$ scalers of which $(n + 1)$ have inputs connected to each signal line,



$(n + 1)$ adders each having at least $(m + 1)$ inputs of which one of said is inputs connected to the output of each of $(m + 1)$ of said scalers, all of said scalers having their inputs connected to different signal lines, and

$n$ multipliers each having one input connected to the output of a different one of $n$ of said adders, a second input connected with a source of a signal representing $y$ and an output connected to the input of the remaining adder, said remaining adder having an output for emitting an output signal $z$.

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**3,866,032**

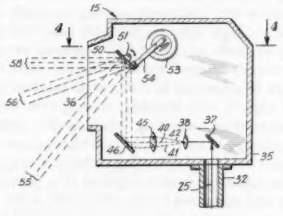
**RUNWAY ILLUMINATION SYSTEM**

**Raymond M. Veres, 1145 E. 35th St., Brooklyn, N.Y. 11210**

**Filed Mar. 19, 1973, Ser. No. 342,753**

**Int. Cl. B64f** *1/20*

**U.S. Cl. 240—1.2** **15 Claims**



**1.** A system for providing illuminated striping for a surface, the system comprising:

at least one radiation station; and

means for supporting the radiation station in spaced relationship with one end of the surface, the radiation station including

laser means for producing a beam of coherent visible radiation,

an optical system for projecting the beam so that it lies in a plane which includes the striping, and

means for oscillating the beam at a constant frequency, to produce a visible line along said surface.

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**3,866,033**

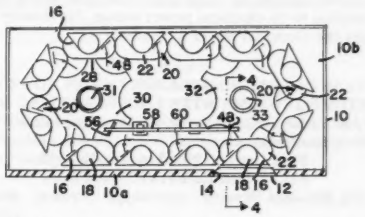
**PHOTOFLASH ASSEMBLY WITH SERIALLY ADVANCING PERCUSSIVE LAMPS**

**John C. Stacy, Watsontown, Pa.; John J. Vetere, Danvers, Mass., and Sedgwick R. Bennett, Williamsport, Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.**

**Filed Nov. 21, 1973, Ser. No. 417,955**

**Int. Cl. G03b** *15/02*

**U.S. Cl. 240—1.3** **19 Claims**



**1.** A photoflash assembly comprising, in combination:

a base member;

a plurality of units, each including a percussively ignitable flashlamp and an associated preenergized striker movably supported on said base member, each striker being individually releasable to fire its respective flashlamp;

means for controlling the path of travel of said movable flashlamp-striker units;

and means for moving said plurality of units along said controlled path of travel to advance said flashlamp-striker units sequentially to a firing position.

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**3,866,034**

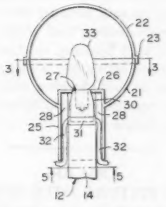
**POST CAP LAMP**

**Michael T. Russo, 1805 Larchwood St., Bloomfield Hills, Mich. 48084**

**Filed Jan. 28, 1974, Ser. No. 437,426**

**Int. Cl. F21v** *33/00*

**U.S. Cl. 240—2 B** **6 Claims**



**1.** A cap lamp for mounting upon the upper end of a post, comprising:

a thin wall hollow body of a light transmitting plastic material;

a downwardly opening post socket formed integral with the lower end of the body and being of a size to snugly receive the upper end of a post for mounting the cap upon the post;

a wall substantially closing off the upper end of the socket, and a central opening formed in said wall;

an electrical bulb-receiving socket member located within the post socket below said wall and having an upper bulb-receiving receptacle positioned beneath said wall opening;

an electrical lightbulb arranged within the body, above said wall and having a base extended downwardly through said opening and releaseably engaged with said receptacle, for securing the bulb-receiving socket member within the post socket; and

a vertically extending inwardly opening channel formed within a generally vertical inner wall surface of the post socket and extending the height thereof, said electrical bulb-receiving socket member having a generally vertical surface closely adjacent said post socket vertical surface, and a relatively stiff, electrical wire extending from the bulb-receiving socket member vertical surface and projecting immediately into and extending along said channel for holding said bulb-receiving socket against turning and twisting relative to the post socket, said wire further extending from the lower end of the post socket for connection to an electrical power source, for thereby carrying the electrical power to the bulb.

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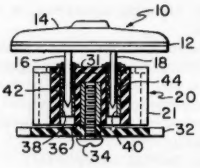
**3,866,035**

## COSTUME JEWELRY WITH LIGHT-EMITTING DIODE

**Curry E. Richey, Jr., Huntsville, Ala., assignor to Avco Corporation, Huntsville, Ala.**

**Filed Oct. 1, 1973, Ser. No. 402,017**
**Int. Cl. F21v** *33/00*
**U.S. Cl. 240—6.4 W** **8 Claims**




1. In combination, an article of jewelry adapted to be attached to the clothing of a wearer, said article comprising an insulated printed circuit board having a plurality of electrical components mounted thereon, said components when energized forming an oscillator circuit, said oscillator circuit including a light-emitting diode;

light transmitting means enclosing said printed circuit board and said electric circuit, at least said illuminable device being visible therethrough when said device is illuminated;

a housing for a two-terminal battery, and

mating connectors on said housing and said article for mechanically interconnecting said article and said housing, said article and said housing in combination with said mating connectors providing a clasp for securing said article of jewelry to said clothing, said mating connectors also electrically connecting said battery to said circuit for energizing said circuit.

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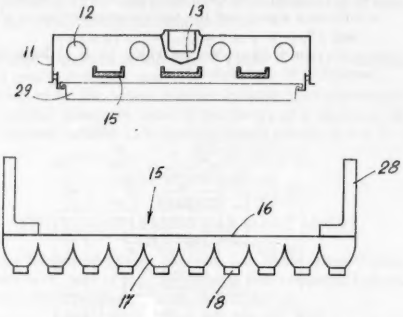
**3,866,036**

## FLUORESCENT FIXTURE WITH OPTICAL DEVICE

**Ignacio Goytisolo Taltavull, Madrazo No. 83, Barcelona, Spain**

**Filed Apr. 16, 1974, Ser. No. 461,446**
**Int. Cl. F21v** *5/02, 11/02;* **F21s** *3/00*
**U.S. Cl. 240—51.11 R** **21 Claims**

1. An optical device to improve the distribution of luminous flux in lighting apparatus fitted with at least one fluorescent tube which consists of an elongated element in the form of a strip made of transparent material, the length of such elongated element being substantially equal to the length of a fluorescent tube and its width equal to or greater than the width of a fluorescent tube, one of the larger faces of such elongated element having a flat plain surface and the other face a plurality of longitudinally placed triangular prisms, the bases of such triangular prisms situated close together on said face of the strip and the free salient angles of such triangular prisms being truncated in a plane parallel to the base, each angle being substituted by a prismatic portion of rectangular transversal section of small height, the larger free face of the




rectangular prismatic portions having a surface capable of intercepting the luminous rays which strike it, such strip element being placed beneath and parallel to the tube or tubes of the lighting apparatus.

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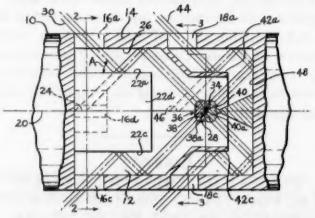
**3,866,037**

## OPTICAL SYSTEMS AND ASSOCIATED DETECTING MEANS

**George R. Simpson, South Woodstock, Conn., assignor to American Optical Company, Southbridge, Mass.**

**Filed Nov. 22, 1957, Ser. No. 698,896**
**Int. Cl. H01j** *3/14*
**U.S. Cl. 250—216** **8 Claims**




1. An opaque main supporting housing and a light-collecting and detecting system disposed within said supporting housing and intermediate the spaced opposite ends thereof, said housing surrounding said light-collecting and detecting system and said system being arranged to simultaneously view through light apertures in side wall portions of said housing all parts of a first and a second predetermined generally conically shaped endless annular object field outwardly of said housing and in concentric relation to a central longitudinal axis of said housing, said system comprising a single photosensitive detecting element for detecting any appreciable change in light intensity which occurs in any part of either object field, said detecting element being of relatively small predetermined size and disposed at a fixed location in said housing and upon said longitudinal axis, a first group and a second group of similar light apertures arranged in longitudinally spaced relation to each other in side wall portions of said housing, and the light apertures of each group being arranged in circumferentially spaced relation, each light aperture being of relatively small dimensions both in the longitudinal and circumferential directions thereof, and separated from adjacent apertures of the same group by side wall portions of said housing of appreciably greater circumferential dimension, the light apertures of said first group being arranged to face outwardly at a first predetermined look angle relative to said

longitudinal axis toward different predetermined sectors, respectively, of said first object field, and the light apertures of said second group being arranged to face outwardly at a second predetermined look angle relative to said longitudinal axis toward different predetermined sectors, respectively, of said second object field, each light aperture of each group being of such a shape as to admit into the interior of said housing light from all parts of the predetermined sector aligned therewith, the circumferential spacing between adjacent apertures of each group and the angular field of view of each aperture of the same group being so related as to allow all of the apertures of the same group to jointly simultaneously admit into said housing light from all parts of the endless annular object field aligned therewith, said light-collecting and detecting system also comprising optical means for receiving and directing the light energy which enters said housing through said apertures from all azimuths of all sectors of both endless annular object fields onto said photosensitive detecting element, said optical means comprising a first plurality and a second plurality of unitary optical systems, with each unitary optical system of said first plurality optically aligned with a different respective light aperture of said first group and with said detecting element, and with each unitary optical system of said second plurality optically aligned with a different respective light aperture of said second group and with said detecting element, and each of said unitary optical systems being disposed in said housing so as to focus upon said detecting element and form a real image of said detecting element at the plane of the light aperture aligned therewith, each optical system comprising a plurality of optical components having spaced optical surfaces thereon including a first optical surface for collecting substantially all of the light from the object field which enters the light aperture aligned therewith and for directing substantially all of the light so collected toward a second optical surface on said components, said second optical surface being a positive surface for receiving substantially all of said light and directing same as a focused beam onto said single photosensitive detecting element.

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**3,866,038**

## APPARATUS FOR MEASURING SURFACE FLATNESS

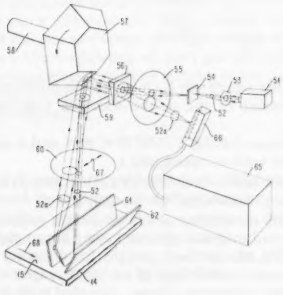
**Hans E. Korth, Stuttgart, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 13, 1973, Ser. No. 415,475**

**Claims priority, application Germany, Nov. 18, 1972, 2256736**

**Int. Cl. H01j** *3/14*

**U.S. Cl. 250—236** **5 Claims**



**1.** Apparatus for measuring the flatness of a surface comprising:

means for producing a beam of light;

deflection means for producing a deflected beam by periodically deflecting said beam in a known manner, said deflection means being of such a nature that when said deflected beam is reflected back to said deflecting means, said deflected beam will be again deflected in a manner which is substantially equal and opposite to, and thus compensates for, said original deflection;

a first mirror for reflecting said deflected beam onto said surface at a predetermined angle;

a second mirror for reflecting said deflected beam, after it has been reflected at said surface, back toward said deflection means; and

sensing means, positioned to receive said deflected beam after it has been deflected a second time by said deflection means, for sensing the displacement between the twice-deflected beam and the orginal beam of light;

said displacement being a function of the height, in relation to the rest of said surface, of the point on said surface upon which said deflected beam impinged.

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**3,866,039**

## DEVICE FOR PRODUCING A HOMOGENEOUS BEAM OF SOLID PARTICLES

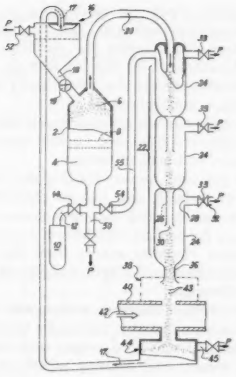
**Richard Geller, Grenoble; Francois Juillet, Bron, and Paul Meriaudeau, Rillieux, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Jan. 7, 1974, Ser. No. 431,316**

**Claims priority, application France, Jan. 11, 1973, 73.00882**

**Int. Cl. H01j** *37/00*

**U.S. Cl. 250—251** **13 Claims**



**1.** A device for the production of a homogeneous beam of solid particles, wherein said device comprised:

a gas-tight vessel divided into two sections by a substantially horizontal porous wall,

a source of gas under pressure connected to the lower portion of the vessel for supplying said vessel with gas at a flow rate which is adjustable by means of a valve,

a tank for supplying powder constituted by said solid particles, said supply tank being adapted to communicate with the upper portion of said vessel,

a duct for connecting the upper portion of the vessel to the upper portion of a pumping column, the delivery duct of said column being such as to constitute the outlet of said device.

## 3,866,040
## METHOD FOR THE CONTINUOUS TESTING OF LONG COMPONENTS FOR LEAKAGE, AND SYSTEM FOR PERFORMANCE THEREOF

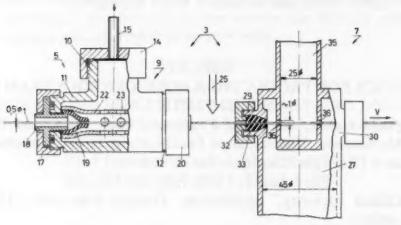
**Christoph Engler, Ennetbaden, Switzerland, assignor to Gesellschaft Zur Forderung Der Forschung un Der EIDG. Techn., Hochschule Zurich, Switzerland**

**Filed Nov. 1, 1972, Ser. No. 302,865**

**Claims priority, application Switzerland, Nov. 19, 1971, 16857/71**

**Int. Cl. H01j** *39/34*

**U.S. Cl. 250—281** **3 Claims**



1. An apparatus for the continuous testing of a wire-shaped component of indefinite length for faults in the surface thereof comprising:

helium chamber means for establishing an atmosphere of helium at a pressure greater than atmospheric;

blasting means for cleaning the surface of components passing therethrough by blasting with air;

vacuum chamber means for establishing an atmosphere therein below atmospheric;

analyzer means comprising a mass spectrometer, for analyzing gas evacuated from said vacuum chamber means for the presence of traces of helium;

feed means for continuously feeding the indefinite length component through said helium chamber means, said blasting means and said vacuum chamber means; and

sealing means for sealing said helium chamber means and said vacuum chamber means from the outside atmosphere as the indefinite length component is continuously fed therethrough,

wherein said helium chamber means, said blasting means and said vacuum chamber means are sequentially aligned with respect to said feed means such that said helium chamber means, said blasting means and said vacuum chamber means can simultaneously act on different portions of the same indefinite length component.

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## 3,866,041
## METHOD AND APPARATUS FOR EVALUATING THE GAS CONTENT OF MATERIALS

**Edward A. Attia, San Jose, Calif., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Oct. 23, 1973, Ser. No. 408,928**

**Int. Cl. B01d** *57/44*; **H01j** *39/34*

**U.S. Cl. 250—281** **11 Claims**

1. A method for evaluating material to be utilized in a vacuum interrupter comprising the steps of:

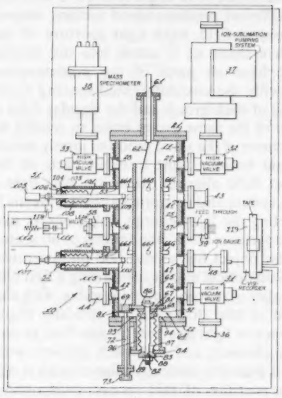
arranging the material in a vacuum chamber;

connecting the material in an electrical d.c. circuit in series with an electrode that is connected to the positive polarity of the circuit so as to function as an anode with the material serving as the cathode;

effecting a separation between the electrode and the material to draw an arc for a predetermined time interval;

interrupting the circuit to extinguish the arc;

determining the gas pressure of the gas evolved during



arcing and the composition of the gas evolved; and,

comparing the results obtained to control data.

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## 3,866,042
## MICROANALYSER CONVERTIBLE INTO A MASS SPECTROMETER

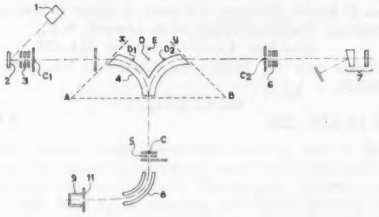
**Jean Vastel, Courbevoie, France, assignor to Compagnie D'Applications Mecaniques a L'Electronique au Cinema et a L'Atomistique (C.A.M.E.C.A.), Paris, France**

**Filed July 17, 1973, Ser. No. 379,925**

**Claims priority, application France, July 21, 1972, 72.26420**

**Int. Cl. H01j** *39/34*, *37/26*

**U.S. Cl. 250—296** **2 Claims**



1. Means for selectively forming an ion microanalyser or a mass-sectrometer of the double-focusing type, said means comprising:

a sliding plate having a solid first part and a second part provided with an aperture;

an ion microanalyser comprising: first means for deriving secondary electrons from a sample and focusing those secondary electrons into a beam having a cross-over; first and second magnetic prisms having a common face and respective second faces; means for directing said beam toward said second face of said first magnetic prism; an electrostic reflecting means, provided with an entrance diaphragm centered at the image point of said cross-over relatively to said first magnetic prism, for reflecting toward said common face those of said secondary ions, let through by said diaphragm, whose energy-to-charge ratio lies under a predetermined threshold, said reflector means comprising a plurality of electrodes including a solid last electrode formed by said solid first part of said sliding plate; an ion electron converter; and means for

directing the ions issuing from said second face of said second magnetic prism toward said ion converter;

a mass-spectrometer comprising, in series: said first means; said first magnetic prism; said diaphragm; and energy filtering electrostatic deflector means; and an ion collector;

means for imparting to said sliding plate a first position for which said first part of said plate forms said last solid electrode of said reflector means, and a second position for which said aperture of said second part is coaxial with said diaphragm; and means for switching the potentials applied to at least two of said electrodes of said reflector means according to whether said plate is in its first or second position.

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**3,866,043**

## COATED PARTICLE FUEL FOR NUCLEAR REACTORS AND TO THE MANUFACTURE OF SUCH FUEL

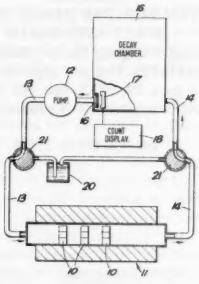
**David Vernon Freck, Stroud, England, assignor to Central Electricity Generating Board, London, England**

**Continuation of Ser. No. 135,231, April 19, 1971, abandoned. This application Sept. 11, 1973, Ser. No. 396,232**

**Claims priority, application Great Britain, Apr. 20, 1970, 18833/70**

**Int. Cl. G01t** *1/00*; **G21c** *3/02*

**U.S. Cl. 250—303** **3 Claims**




1. In the manufacture of fuel bodies for a nuclear reactor having fuel particles of compacted powdered fuel material coated with a pyrolytic carbon coating and without metal cladding but surrounded by an outer matrix graphite, a method of testing the integrity of the pyrolytic carbon coating prior to irradiation in a reactor comprising the steps of incorporating radium 226 into the fuel material, heating the fuel bodies in a furnace to a temperature of at least 800°C without irradiation whilst circulating an inert gas through the furnace to pass over the matrix graphite surface of the fuel bodies and checking the gas which has passed over said fuel bodies for the presence of radon 222.

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**3,866,044**

## APPARATUS FOR DETERMINING CONCENTRATION PROFILE OF AN ELEMENT

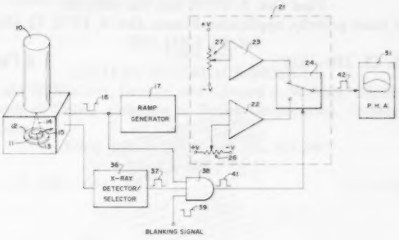
**J. Evan Grund, Hayward, Calif., assignor to Nuclear Equipment Corporation, San Carlos, Calif.**

**Filed Feb. 1, 1974, Ser. No. 438,696**

**Int. Cl. H01j** *37/26*

**U.S. Cl. 250—310** **9 Claims**

6. In apparatus for determining the distribution of a predetermined element in a specimen from signals produced by repeatedly scanning a portion of the specimen with an electron beam and delivering an output signal whenever the element is detected, the start of each scan being accompanied by a timing signal: a ramp generator for producing a ramp signal which increases at a predetermined rate from an initial level, means for applying the timing signal to the ramp generator for resetting the ramp signal to the initial level at the outset of each scan, whereby the level of the ramp signal corresponds to the position of the beam on the specimen, and analog gate




means responsive to the output signals for passing the ramp signal to produce output pulses having heights corresponding to the positions of the beam when the predetermined element is detected.

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**3,866,045**

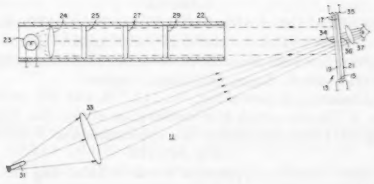
## NIGHT VISION DEVICE

**Richard E. Ely, Huntsville, and Raymond W. Conrad, Russellville, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation-in-part of Ser. No. 179,216, Sept. 9, 1971, abandoned. This application Nov. 27, 1973, Ser. No. 416,904**

**Int. Cl. G01j** *1/48*

**U.S. Cl. 250—331** **5 Claims**



1. A device for night vision of an object comprising: a screen with a layer of cholesteric material therein provided with one face for presentation and an opposite face for visible irradiation, a tube mounted relative to said screen for irradiation of said opposite face with circularly polarized monochromatic light, means for heating the layer of cholesteric material to the critical temperature for maximum attenuation of said circularly polarized monochromatic light, and means for focusing on said opposite face infrared rays from an object to provide an image thereof on said presentation face.

**3,866,046**

## DEVICE FOR DIGITAL DETECTION OF OPTICAL RADIATION

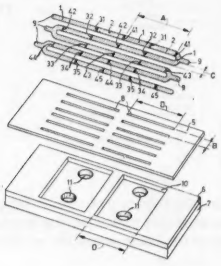
**Francois Desvignes, Bourg la Reine; Raymond Hybois, Chevilly Larue, and Dean Lebrun, Paris, all of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 5, 1973, Ser. No. 403,927**

**Claims priority, application France, Oct. 9, 1972, 72.35684**

**Int. Cl. G01j** *5/02*

**U.S. Cl. 250—338** **6 Claims**



**1.** A device for detecting electromagnetic radiation comprising a support of thermally conductive material, a thin insulating substrate on said support, a plurality of series-connected thermocouples on said insulating substrate arranged in a pattern which comprises a plurality of straight parallel rows each constituted by a series of alternate elements made of two different electrically conductive materials, said electrically conductive materials being disposed so that the edges of adjacent elements overlap one another so as to form junctions, alternate junctions being thermally insulated and constituting the hot junctions of a thermocouple, while the junctions of either side of a hot junction, which serve as connections to the preceding thermocouple and to the succeeding thermocouple, constitute cold junctions which are in thermal contact with the said support through the very thin insulating substrate, said substrate having slits formed between and parallel to the straight parallel rows of the pattern, a slit being interposed between each two adjacent rows.

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**3,866,047**

## PENETRATING RADIATION EXAMINING APPARATUS HAVING A SCANNING COLLIMATOR

**Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, Middlesex, England**

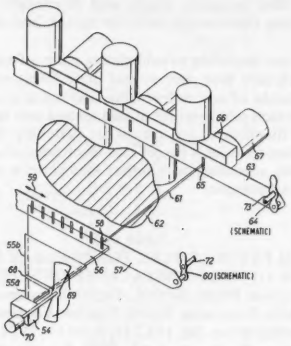
**Continuation-in-part of Ser. No. 212,778, Dec. 27, 1971, Pat. No. 3,778,614, which is a continuation of Ser. No. 861,538, Aug. 21, 1969, abandoned. This application Apr. 9, 1973, Ser. No. 349,198**

**Claims priority, application Great Britain, Aug. 23, 1968, 40317/68**

**Int. Cl. G01n** *23/00*

**U.S. Cl. 250—360** **7 Claims**

**1.** Apparatus for examining a body by means of penetrating radiation such as X- or $\gamma$- radiation, including source means for producing a substantially planar, sectoral-shaped swath of the radiation, directed towards the body, the plane of the swath being arranged to define a plane of interest in the body, detector means disposed to receive radiation emergent from the body, the source means and the detector means being disposed on opposite sides of an aperture in which the body can be inserted, collimator means disposed between the source means and the detector means and having a plurality of apertures formed therein through which respective finger-like beams of the radiation can pass such that the beams traverse respective linear paths in said plane of interest through the body, said detector means including a respective detector device for each of said beams, first drive means for causing said collimator means to execute a periodic, reciprocating motion in the plane of the swath to scan said beams to




and fro relative to the body, and second drive means for orbiting the source means, the detector means and the collimator means around the body in the plane of said swath.

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**3,866,048**

## DRIVE SYSTEM FOR THE IMAGE SECTION OF AN X-RAY APPARATUS

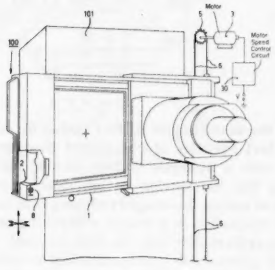
**Kurt Gieschen, and Wolfgang Hecker, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed June 28, 1973, Ser. No. 374,513**

**Claims priority, application Germany, July 13, 1972, 2234398**

**Int. Cl. G01n** *21/34*

**U.S. Cl. 250—449** **11 Claims**




**1.** A drive system for power assisting an individual in displacing a mass which is free to move, such that the mass moves in response to manually applied forces as if it had a lower than actual mass, comprising for each direction in which such power assisting is desired:

means for sensing the amount of force manually applied to said mass in such direction;

integrating means responsive to said sensed amount of force for generating a voltage proportional to the time integral thereof;

a variable speed electric motor coupled to said mass to assist in moving said mass in such direction, the velocity of said mass in such direction being proportional to the speed of said motor;

a motor speed control circuit responsive to said generated voltage proportional to the time integral and electrically connected to said motor to drive said motor at a speed proportional to said generated voltage, whereby said motor so assists in moving said mass in such direction that said mass moves in response to said manually applied

force in such direction as if it had a lower than actual mass.

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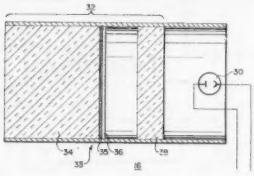
3,866,049

## LIGHT SOURCE

Robert W. Allington, Lincoln, Nebr., assignor to Instrumentation Specialties Company, Lincoln, Nebr.

Filed Mar. 9, 1973, Ser. No. 339,570
Int. Cl. F21v 9/16
U.S. Cl. 250—487 10 Claims



1. An apparatus for emitting light of a first wavelength in a predetermined direction in response to light of a second wavelength, comprising:

transducer means for emitting light of said first wavelength when excited by light of said second wavelength;

said transducer means including means for emitting light of said first wavelength in at least one direction other than said predetermined direction:

said transducer means including controlled light scattering means for changing the direction of at least some of said light emitted in said one direction other than said predetermined direction to said predetermined direction and light-propagation means for reducing the amount of light of said first wavelength traveling in said predetermined direction that is scattered into other directions by said controlled light-scattering means;

said light-propagation means including means for reducing the backscattering of light of said second wavelength.

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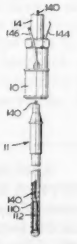
3,866,050

## REMOTELY CONTROLLED BRACHYTHERAPY UNIT

Douglas Whitfield, Stittsville, Ontario, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Ontario, Canada

Continuation of Ser. No. 266,507, June 26, 1972, abandoned. This application Nov. 9, 1973, Ser. No. 414,436
Claims priority, application Canada, May 15, 1972, 142103
Int. Cl. G21h 5/00; G21k 1/00
U.S. Cl. 250—497 16 Claims



1. A method of selectively distributing the radioactive emission from a source disposed to irradiate a given volume of material in a predetermined pattern in the body of a patient, comprising the steps of:

disposing a source in a selected position in the body of a patient,

oscillating said source about said selected position for a selected period of time, and

enclosing the source ina container which is fixed relative to said body of said patient wherein the distribution of radioactive emission is non-spherical.

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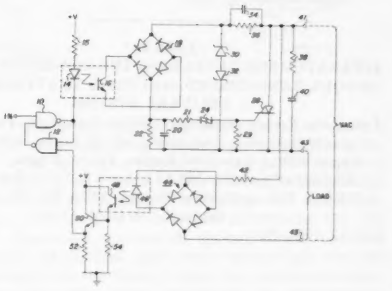
3,866,051

## DIGITAL INTERFACE MODULE

Gerald W. Shearer, Orange, and Edward A. Wakida, Gardena, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 1, 1973, Ser. No. 328,587
Int. Cl. H01j 39/12
U.S. Cl. 250—551 22 Claims



1. An interface between a digital device and a load to which a load voltage is to be applied, comprising:

a. gating means for receiving a digital control signal from said digital device, said gating means being conditionally responsive to receipt of information from said load voltage,

b. means, including a first optical coupler means, for transmitting said control signal to a switching means, said switching means being operable to apply said load voltage to said load,

c. means, including a second optical coupler means for transmitting said information to said gating means, and

d. whereby receipt of said information by said gating means allows transmission of said control signal.

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3,866,052

## METHODS FOR GENERATING SIGNALS DEFINING THREE-DIMENSIONAL OBJECT SURFACES

Paul L. Di Matteo, Dix Hills; Joseph A. Ross, Fort Salonga, and Howard K. Stern, Greenlawn, all of N.Y., assignors to Dynell Electronics Corporation, Melville, N.Y.

Filed Nov. 2, 1973, Ser. No. 412,162
Int. Cl. H01j 39/12
U.S. Cl. 250—558 15 Claims

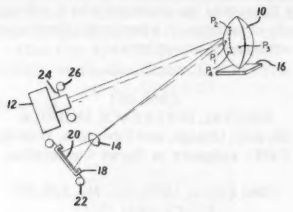
1. A method for providing an output signal for use in defining the spatial position of a point on the surface of an object, comprising the steps of:

a. defining a projection field extending from a first location and including at least a part of said object surface including said point;

b. successively irradiating portions of said object surface part by successively projecting radiant energy from said first location into predetermined segments of said projection field, said segments collectively defining said projection field;

c. making a separate record of said object surface part for each such irradiation thereof; and

d. generating a signal indicative both of the number of said records made and of those of said records which include said surface point, such generated signal constituting said output signal.

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**3,866,053**

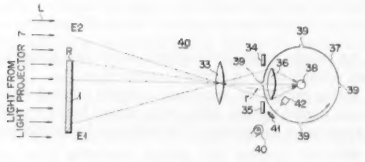
**APPARATUS FOR DETECTING THE CONDITION OF AN OPAQUE BAND-SHAPED MATERIAL TRAVELLING ON A DELIVERY SYSTEM**

**Tokumatsu Emura, Yokohama; Shigeo Kawabata, Tokyo, and Takashi Shimoma, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 348,111, April 5, 1973, Pat. No. 3,833,816. This application May 30, 1974, Ser. No. 474,593**

**Int. Cl. G01n** *21/30;* **G06k** *11/02*

**U.S. Cl. 250—561** **1 Claim**




**1.** An apparatus for detecting the parallelism between the lengthwise edge of an opaque band-shaped material travelling on a delivery system and the longitudinal axis of said delivery system which is set at a right angle to the cutting blade of a shearing machine to which the band-shaped material is to be delivered, comprising a first and a second detector spatially arranged along said lengthwise edge, in the direction of which it travels on the delivery system so as to detect the position of said edge, each detector comprising a first lens for focusing light from a light projector, a view mask bored with an opening in that section where light is focused by said first lens, a second lens for further focusing the light image already obtained in the view mask, a photoelectric conversion element disposed in a position where light is focused by the second lens, a scanning drum located between the view mask and the second lens and perforated with at least one scanning slit and a synchronizing pulse generator associated with said scanning drum; and the means for generating a signal indicating the parallelism of the band-shaped material comprises means for shaping the wave form of outputs from the first and second detectors, a clock pulse generator, a first and a second AND gate supplied with outputs from the wave shaping means and clock pulse generator, a subtracting gate designed to produce a signal representing the difference between the numbers of output pulses from the first and second AND gates, a counter for counting a number of pulses generated with the rotation of the cutter of the shearing machine, an AND gate supplied with carry signals from the counter and outputs from the subtracting gate, and a display unit, an upper-lower limit alarm unit and a rejection output unit, the three last-mentioned members being supplied with outputs from the last-mentioned AND gate.

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**3,866,054**

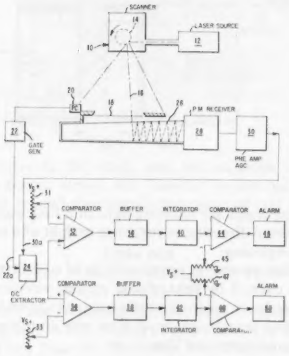
**DEFECT SIZE DISCRIMINATOR CIRCUIT FOR WEB INSPECTION SYSTEM**

**William Edward Wolf, Newark, Del., assignor to E. I. duPont de Nemours and Company, Wilmington, Del.**

**Filed Sept. 28, 1973, Ser. No. 401,905**

**Int. Cl. G01n** *21/30*

**U.S. Cl. 250—562** **3 Claims**




**1.** In an inspection system for web materials that includes electronic means responsive to means scanning the web for detecting defects in the web, said electronic means providing output signals representative of said defects, said signals having AC and DC components, the improvement comprising: a signal amplitude discriminator circuit coupled to said electronic means, said circuit including means for extracting the DC component of said signals and providing an AC signal output; first and second comparator means operating in parallel for processing said AC signal output, each comparator producing a set of logic pulse output signals, one set of logic pulse output signals from said first comparator exceeding a positive preset primary threshold value, the other set of logic pulse output signals from said second comparator exceeding a negative preset primary threshold value; first and second signal switched integrators coupled to the first and second comparator means respectively and operated by said logic pulse output signals for integrating said logic pulse output signals for the duration of each of said logic pulse output signals and for producing a signal amplitude proportional to each of said logic pulse output signals; and means coupled with each integrator means for comparing the amplitude of said integrated values of said logic pulse output signals with preselected secondary threshold values and signalling when the amplitude of said integrated values of said logic pulse output signals exceeds said preselected secondary threshold values.

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**3,866,055**

**LASER DOPPLER VELOCIMETRY**

**Edward Roy Pike, Malvern, England, assignor to National Research Development Corporation, London, England**

**Filed Jan. 15, 1974, Ser. No. 433,533**

**Claims priority, application Great Britain, Jan. 17, 1973, 2416/73**

**Int. Cl. G01n** *21/30;* **G01p** *3/36*

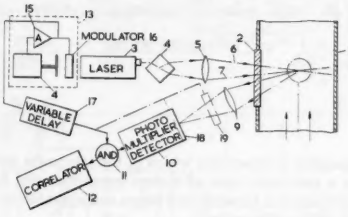
**U.S. Cl. 250—564** **6 Claims**

**1.** Apparatus for measuring fluid flow comprising source of

highly coherent radiation capable of giving an output beam of very short pulses of radiation,

means for splitting the output beam into twin beams,

means for causing the twin beams to intersect where required,




means for detecting and producing a signal representative of radiation scattered by particles moving through the intersection of the twin beams,

means for processing the signal from the means for detecting radiation to provide a Doppler signal representing the velocity of fluid flow through the said intersection, and

means for range gating the scattered radiation so that only radiation scattered from the intersection is processed.

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**3,866,056**

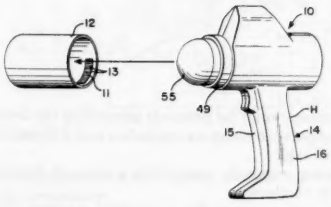
## SCANNING APPARATUS

**Max E. Minniear, Dayton, and Carlos B. Herrin, Bellbrook, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio**

**Filed Dec. 17, 1973, Ser. No. 425,396**

**Int. Cl. G01n** *21/30*

**U.S. Cl. 250—566** **14 Claims**



1. Apparatus for scanning a concave coded record, comprising: a rotor, means carried by the rotor for illuminating the coded record, a light receptor, means providing a reflected light path from the coded record to the light receptor, a cover, means for movably mounting the cover for movement between one position in which the cover is in the reflected light path and another position in which the cover is out of the reflected light path, and means for driving the rotor to effect scanning of the record when the cover is in the other position.

**3,866,057**

## METHOD AND APPARATUS FOR MEASURING GAS FLOW

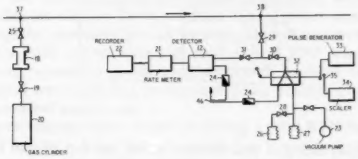
**Walter Thomas Spragg, Sutherland, New South Wales, and Brian William Seatonberry, Sans Souci, New South Wales, both of Australia, assignors to Australian Atomic Energy Commission, New South Wales, Australia**

**Filed Mar. 22, 1973, Ser. No. 344,034**

**Claims priority, application Australia, Mar. 24, 1972, 8410/72**

**Int. Cl. G21h** *5/00*

**U.S. Cl. 250—303** **14 Claims**




1. A method of determining the mass flow rate of gas in a pipeline or duct comprising the steps of injecting into the pipeline at an upstream point a first charge of radioactive tracer, extracting for a period of time a sample of the gas from the pipeline at a substantially constant flow rate, the extraction being at a point sufficiently far downstream that the tracer is distributed substantially homogeneously over the cross-section of the pipe, said period substantially covering the time taken for the tracer to pass the downstream point, recording said period, mixing said sample to a uniform concentration of tracer, placing at least part of said mixed sample in a fixed volume radioactivity detector and determining a count rate corresponding thereto whereby the mass of gas in the pipeline passing the point of complete mixing of the tracer during the recorded time period may be determined by comparing the said count rate with a standard count rate obtained by placing in said detector a standard sample obtained from the dilution of a second charge of radioactive tracer, the total activity of which has a known relation to that of said first charge, in a known standard volume.

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**3,866,058**

## POWER-GENERATING SYSTEM AND METHOD

**Gerhard Lenssen, Bernkastel, Germany, assignor to Rheinisch-Westfalisches Elektrizitatswerk AG, Essen, Germany**

**Filed July 23, 1973, Ser. No. 381,434**

**Claims priority, application Germany, July 22, 1972, 2236059; Sept. 8, 1972, 2244084**

**Int. Cl. F02c** *3/12*

**U.S. Cl. 290—52** **8 Claims**

1. A power-generating system including an electrical generator, a gas turbine connected to said generator, a compressor connected to said turbine and a subterranean air-storage chamber connectable to said gas turbine at least intermittently for supplying air thereto under pressure, the improvement wherein said subterranean chamber comprises:

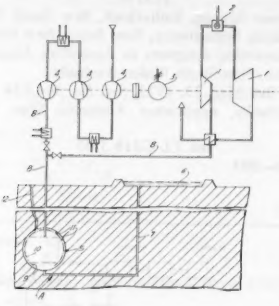
a cavern below the ground;

a downwardly open bell-shaped generally impermeable hood received in said cavern and supported thereagainst while having a free lower edge spaced from the bottom and lateral walls of said cavern

means communicating with the interior of said hood for feeding air to and withdrawing it from said chamber;

a reservoir containing a liquid to a level above the top of said chamber and hydraulically connected to said cavern for applying pressure to air in said hood upon displacement of the liquid by introduction of air into said chamber; and

means for maintaining the level of said liquid in said hood above the mouth thereof in a condition of said chamber



fully charged with air and below the top of said hood in the fully discharged condition of said chamber.

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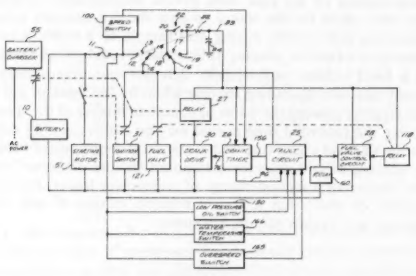
**3,866,059**

## ENGINE STARTING CONTROL SYSTEM

**Walter C. Przywozny, Whippany, N.J., assignor to Automatic Switch Company, Florham Park, N.J.**

**Filed Nov. 12, 1973, Ser. No. 415,267**
**Int. Cl. F02n** *11/00*
**U.S. Cl. 307—10 R** **6 Claims**



1. A control system for an engine having a starting motor, a battery, and an ignition switch for connecting the battery to the motor to crank the engine, the system comprising:

a. means for providing a start signal,

b. a solid state counter for providing a plurality of periodic pulses in response to a single start signal,

c. means responsive to said pulses for closing and opening the ignition switch a plurality of times so as to energize and deenergize the starting motor to periodically crank the engine, and

d. means responsive to a predetermined number of pulses from said counter for terminating the output of further pulses from said counter and hence for terminating engine cranking.

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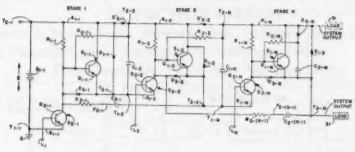
**3,866,060**

## ELECTRIC POWER SOURCE

**Lawrence H. Bannister, Dedham, and Richard H. Baker, Bedford, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Dec. 19, 1973, Ser. No. 426,269**
**Int. Cl. H02m** *3/00*
**U.S. Cl. 307—43** **23 Claims**

1. An electric system that comprises a plurality of N stages connected in cascade, each stage including supply voltage means connected along two alternate conductive paths to an electric output terminal of the stage, thence to the next succeeding stage and, eventually, to the electric output terminal of the Nth stage, switch means in each stage being connected



and operable to determine which of the two paths is conductive at a particular state of system operation; and feedback means connected between said stages and operable to control, in part, said switch means.

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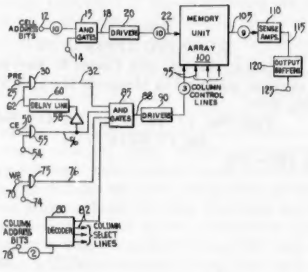
**3,866,061**

## OVERLAP TIMING CONTROL CIRCUIT FOR CONDITIONING SIGNALS IN A SEMICONDUCTOR MEMORY

**Samuel S. Wen, Teaneck, and Donald J. Nelson, Sayreville, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Aug. 27, 1973, Ser. No. 391,963**
**Int. Cl. H03k** *19/08, 1/00*
**U.S. Cl. 307—208** **5 Claims**



1. A timing circuit for precisely controlling the time during which first pulses overlap second pulses on a different conductor comprising:

first gating means for controlling a series of first pulses on a first conductor;

second gating means for controlling a series of second pulses on a second conductor, each of the second pulses overlapping the first pulses;

inverting means coupled to said second gating means for providing the inverse of the second pulses;

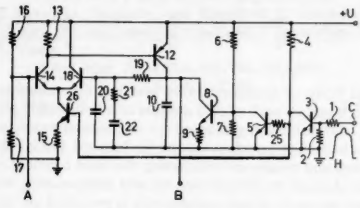
delay means coupled to said inverting means for delaying the inverse of the second pulses for a predetermined interval; and

connecting means for delivering the delayed inverse of the second pulses to said first gating means thereby controlling the conduction of said first gating means and providing resultant pulses which overlap the second pulses for a predetermined time.

## 3,866,062
## CIRCUIT ARRANGEMENT FOR SYNCHRONISING OF THE LINE DEFLECTION IN A TELEVISION RECEIVER WITH A SAWTOOTH SIGNAL HAVING CONSTANT MEAN VALUE AND SLOPE

**Hans-Heinrich Feindt, Schenefeld Kurzer Kamp, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 240,014, March 31, 1972, abandoned. This application Oct. 2, 1973, Ser. No. 402,843**
**Claims priority, application Germany, Apr. 28, 1971, 2120772**
**Int. Cl. H03k** *4/08*
**U.S. Cl. 307—228** **4 Claims**

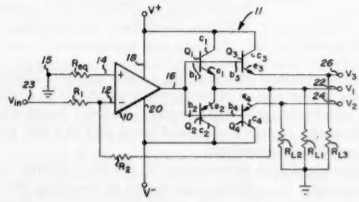



1. A circuit for producing a sawtooth signal from a television horizontal flyback pulse, said circuit comprising limiting means having an input means for receiving said flyback pulse and an output means for supplying an amplitude limited flyback pulse; a capacitor; and means for producing said sawtooth signal with a substantially constant mean value and flyback period slope regardless of duration changes in said flyback pulse comprising means coupled to said capacitor and said output means for discharging said capacitor during the occurrence of said flyback period and charging said capacitor during the horizontal scanning period.

## 3,866,063
## IMPROVED RECTIFYING CIRCUIT

**David K. Long, Sunnyvale, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Filed Oct. 23, 1973, Ser. No. 408,682**
**Int. Cl. H03k** *5/08*; **H03f** *3/18*, *1/34*
**U.S. Cl. 307—230** **5 Claims**




1. A rectifying circuit having first, second, and third output terminals comprising:

a. operational amplifying means responsive to an input signal and operative to develop an amplified signal commensurate therewith, which includes an inverting input terminal, and a feedback circuit coupled between said inverting input terminal and the first output terminal;

b. a first NPN transistor having a base element coupled to the output of said operational amplifying means, a collector element for connection to a power supply of positive potential and an emitter element connected to the first output terminal;

c. a first PNP transistor having a base element coupled to the output of said operational amplifying means, a collector element for connection to a power supply of negative potential, and an emitter element connected to the first output terminal, said first NPN transistor and said first PNP transistor being operative to develop a non-rectified output signal at the first output terminal corresponding to said amplified signal;

d. a second NPN transistor having a base element coupled to the output of said operational amplifying means, a collector element for connection to said power supply of positive potential and an emitter element connected to the second output terminal, said second NPN transistor being operative to develop a first rectified output signal corresponding to positive-going polarities of said signal;

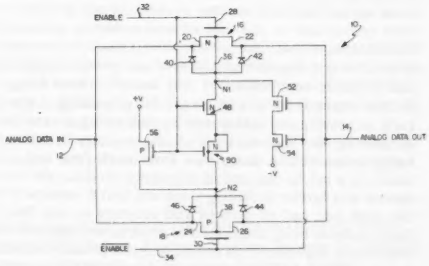
e. a second PNP transistor having a base element coupled to the output of said operational amplifying means, a collector element for connection to said power supply of negative potential and an emitter element connected to said third output terminal, said second PNP transistor being operative to develop a second rectified output signal corresponding to negative-going polarities of said amplified signal; and

f. a pre-biasing circuit means including a third NPN transistor having a base element coupled to the output of said operational amplifying means, a collector element connected to the base of said first NPN transistor and an emitter element connected to the base of said first PNP transistor.

## 3,866,064
## CMOS ANALOG SWITCH

**Charles Roy Gregory, Melbourne, and William Harold White, Indialantic, both of Fla., assignors to Harris-Intertype Corporation, Cleveland, Ohio**

**Filed Aug. 22, 1973, Ser. No. 390,499**
**Int. Cl. H03k** *17/00*
**U.S. Cl. 307—251** **10 Claims**




6. A CMOS switch having an input terminal and an output terminal comprising:

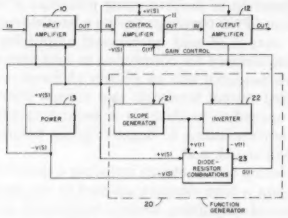
a pair of complementary metal oxide semiconductor devices dielectrically isolated having gates and bodies and being connected in parallel between said input and output terminals by their sources and drains; and

a first means connected to said pair's bodies for providing a conduction path between said bodies in response to appropriate gating signals applied to said first means and for limiting the maximum voltage between said source and said bodies of said pair.

## 3,866,065
## WAVEFORM CONTROL CIRCUIT USING GAIN-CONTROLLED AMPLIFIER STAGE

**Pat H. McIngvale, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation-in-part of Ser. No. 298,194, Oct. 17, 1972, abandoned. This application Feb. 21, 1974, Ser. No. 444,580**
**Int. Cl. H03k *1/14***
**U.S. Cl. 307—260** **3 Claims**



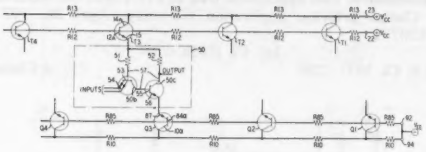

1. An electrical waveform control circuit employing a gain controlled amplifier stage wherein said stage has at least a gain control input, a power input, and signal input and output terminals, said circuit including: power supply means having a positive terminal and a negative terminal; function generating means connected to said power supply means and including means connected between said power supply means and said gain control input of said amplifier stage, wherein said function generating means includes means for generating a wave linearly increasing from a value less than the potential of the positive terminal of said power supply up to the value of said potential, combining means having inputs and an output; means connected to said means for generating for providing a wave linearly decreasing from said potential to a value less than said potential, said means connected between said power supply means and said gain control input including first and second sets of series-connected resistors and diodes, each set including first and second subsets of resistors, each subset in a set having the same number of resistors and having a common connection at one end of said resistors, said common connections of said first subsets being respectively connected to positive and negative terminals of said power supply means, said common connections of said second subsets being connected respectively to said means for generating a wave linearly increasing and said means for generating a wave linearly decreasing, the opposite ends of said resistors in said subsets being connected in pairs, one from each first and second subset in a set, to one end of respective diodes, said first and second sets further including third and fourth subsets of resistors with one end of each of said resistors in said third and fourth subsets being connected to a respective opposite end of said diodes, the other ends of said resistors in said third subsets being connected in common to one input of said combining means and to bias means connected to the negative terminal of said power supply means, the other ends of said resistors of said fourth subset being connected to another input of said combining means, and the output of said combining means connected to said gain control input of said amplifier stage.

## 3,866,066
## POWER SUPPLY DISTRIBUTION FOR INTEGRATED CIRCUITS

**Richard Alan Pedersen, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 16, 1973, Ser. No. 379,259**
**Int. Cl. H01l *19/00***
**U.S. Cl. 307—297** **13 Claims**

1. An arrangement for distributing a predetermined potential to individual components in an integrated circuit comprising a body of semiconductive material, said arrangement comprising means internal to said body of semiconductive material for connecting each of said components to a source substantially at said potential; said arrangement characterized by a plurality of distribution devices each having a first terminal, a second terminal, a third terminal, a p-n junction disposed between said first and third terminals and a current path between said second and third terminals; first means internal

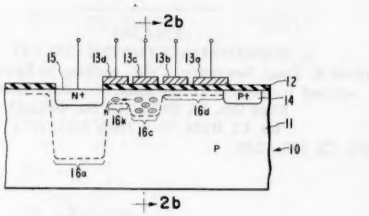



to said body of semiconductive material for connecting the first terminal of each of said devices to a first supply potential point, said point being adapted for connection to said source; means including said first means for forward biasing said p-n junction; and means for connecting the third terminal of each of said devices to at least one of said components, whereby current for each of said components is provided via said current path of a respective one of said devices.

## 3,866,067
## CHARGE COUPLED DEVICE WITH EXPOSURE AND ANTIBLOOMING CONTROL

**Gilbert F. Amelio, Saratoga, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Filed May 21, 1973, Ser. No. 362,131**
**Int. Cl. H01l *17/00***
**U.S. Cl. 307—311** **2 Claims**




1. The method of operating a light sensitive element comprising a first region of semiconductor material overlaid by a first electrode, said light sensing element being capable of containing a charge packet and being part of a charge coupled device which comprises:

allowing charge accumulated in the light sensing element to transfer to a charge sink region by lowering the potential in a first intermediate region in the semiconductor material between said light sensing element and the charge sink region;

raising the potential in said first intermediate region of semiconductor material between said light sensing element and said charge sink region to a level selected to allow a given amount of charge to accumulate in said light sensing element and any additional charge formed in said light sensing element to transfer to said charge sink region;

transferring, at the end of a given time, the charge accumulated in said light sensing element to an adjacent region of semiconductor material by lowering the potential of said adjacent region of semiconductor material and the potential of a second intermediate region of semiconductor material between said adjacent region of semiconduc-

tor material and the light sensing element to levels beneath the potential of said light sensing element; and

raising the potential of said second intermediate semiconductor material to a potential above the potential of said adjacent region of semiconductor material on the completion of the transfer of the charge accumulated in said light sensing element to said adjacent region of semiconductor material.

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**3,866,068**

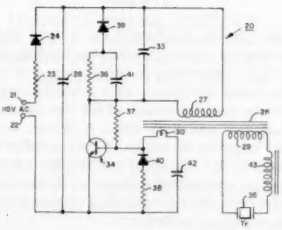
## FREQUENCY VARYING OSCILLATOR CIRCUIT VIBRATORY CLEANING APPARATUS

**Joseph Krenicki, Danbury, and Raymond L. Hunicke, Roxbury, both of Conn., assignors to Lewis Corporation, Woodbury, Conn.**

**Filed Mar. 20, 1974, Ser. No. 452,838**

**Int. Cl. H01v** *7/00*

**U.S. Cl. 310—8.1** **8 Claims**



**1.** An oscillator circuit for sonic and ultrasonic cleaning apparatus comprising:

A. a transformer having a primary winding, a secondary winding, and a feedback loop winding;

B. a substantially unfiltered rectifier connectable to a source of alternating line current, and delivering direct current pulses to the primary winding of said transformer;

C. first capacitance means connected across the primary winding of said transformer;

D. a network incorporating a second capacitance means in series with a blocking diode together connected in parallel with said first capacitance means providing differing effective values of capacitance in parallel with said primary winding during positive and negative half cycles of said alternating line current;

E. said primary winding, said first capacitance means and said parallel network together presenting non-linear impedance characteristics to said rectifier;

F. a piezoelectric transducer connected to said secondary winding of said transformer and also forming part of said cleaning apparatus; and

G. switching means connected to the primary winding of said transformer and the feedback loop winding of said transformer, thereby producing a circuit energizing said transducer with a pulse of oscillatory electrical energy having a plurality of different frequency components in response to each direct current pulse delivered to said primary winding, and providing automatic and controllable shifting between low frequency dominance and high frequency dominance during each said pulse.

**3,866,069**

## HIGH VOLTAGE GENERATING DEVICE

**Akira Ishii, Katano; Kaneichi Kondo, Settsu, and Kenichi Uchibori, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Sept. 4, 1973, Ser. No. 394,270**

**Claims priority, application Japan, Sept. 7, 1972, 47-105007[U]; Nov. 20, 1972, 47-134217[U]; Dec. 13, 1972, 47-143507[U]**

**Int. Cl. H04r** *17/00*

**U.S. Cl. 310—8.7** **2 Claims**

**1.** A high voltage generating device comprising:

a. an outer casing made of a synthetic resin, said outer casing having an open end, a window with a stepped portion located in one side thereof and a pin groove in an internal surface of said outer casing connecting said open end to said window,

b. a piezoelectric element located within said outer casing at one end thereof,

c. an inner casing made of a synthetic resin slidably inserted within said outer casing, said inner casing having a bore with a spring end retaining guide formed therein and a window with an inclined portion located in one surface of said inner casing,

d. an impact element having an impact pin extending from the periphery thereof, said impact element being slidably located within said inner casing with said impact pin projecting through the windows in said inner and outer casings, said impact pin being guided by said pin groove during assembly of said inner and outer casings to the window in said outer casing,

e. an impact spring positioned within the bore of said inner casing with one end secured in said spring end retaining guide and the other end connected to said impact element, said impact spring being twisted to provide it with a torsional restraining force, and

f. a return spring positioned within said outer casing between the piezoelectric element and said inner casing.

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**3,866,070**

## TURBO-GENERATOR OF THE RADIAL SLOT TYPE

**Kristian Dahl Madsen, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden**

**Filed Dec. 18, 1972, Ser. No. 315,870**

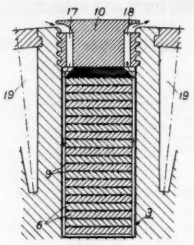
**Claims priority, application Sweden, Dec. 27, 1971, 16611/71**

**Int. Cl. H02k** *3/48*

**U.S. Cl. 310—214** **5 Claims**

**1.** Turbo-generator of the radial slot type of at least 100 MVA and with a speed of at least 1,500 r.p.m., comprising a stator and a rotor surrounded by the stator and having an iron core and a field winding supported by said iron core, the field winding having a plurality of coils per pole, said rotor body having recesses therein of substantially the same form as the coils, each coil being arranged in a corresponding recess, each recess comprising two axially running winding slots, intended for one coil side each and furnished with slot wedges, and two circumferentially running winding slots one arranged at each end of the rotor and each intended for one coil end, each of said circumferentially running winding slots having toothed

walls, and a plurality of slot wedges in each of said circumferentially running winding slots having toothed side surfaces in engagement with the toothed walls of the slots which together absorb at least the greater part of the centrifugal forces acting on a coil end which lies in the slot, said recess having a corner part formed by one end of an axially running winding slot and




one end of a circumferentially running winding slot, at least one of said slot ends having an expanded top part dimensioned to permit radial insertion of a slot wedge intended for the remaining part of the winding slot to such a depth that the toothed surfaces of said slot wedge will be on a level with the corresponding toothed walls of the winding slot.

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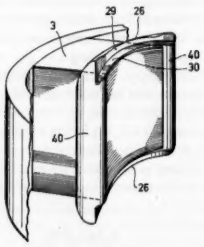
**3,866,071**
**ELECTRIC MACHINES**

**Stig Lennart Hallerback, Vastra Frolunda, Sweden, assignor to SKF Industrial Trading and Development Company N.V., Amsterdam, Netherlands**

**Continuation of Ser. No. 254,186, May 17, 1972,. This application Oct. 31, 1973, Ser. No. 411,433**
**Claims priority, application Sweden, May 18, 1971, 6445/71**
**Int. Cl. H02k** *1/04*
**U.S. Cl. 310—43** **4 Claims**




**1.** An electric machine comprising a stator assembly and a rotor supported for rotation interiorly of the stator assembly, said stator assembly including a relatively yielding stator yoke, at least a pair of radially inwardly extending poles having an arcuate configuration at the inner end faces to define a rotor recess conforming to the contour of the rotor to provide a small air gap therebetween, cup-shaped bearing support means adjacent opposite axial ends of the stator assembly and a molding member consisting of a hardening compound for supporting the poles and being formed with arcuate guide surfaces at opposite axial ends for the cup-shaped bearing support means thereby to support the rotor coaxially with respect to the rotor recess defined by the inner faces of the poles, said molding member circumscribing the poles adjacent the radially inner end faces thereof and having arcuate portions at opposite axial ends of the poles of a predetermined configuration defining transversely oriented abutment and aligning faces for said bearing support means, said molding member having portions connecting the arcuate guide portions at opposite ends operable to provide means for interconnecting the laminations of the poles and to guide said field windings.

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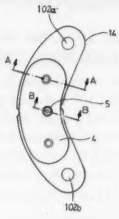
**3,866,072**
**POWER BOOST AUXILIARY DIODE ASSEMBLY FOR VEHICLE ALTERNATOR**

**Yukio Nagai, Kariya, Japan, assignor to Nippondenso Co., Ltd., Aichi-ken, Japan**

**Filed Sept. 28, 1973, Ser. No. 401,579**
**Claims priority, application Japan, Oct. 2, 1972, 47-114**
**Int. Cl. H02k** *11/00*
**U.S. Cl. 310—68 D** **5 Claims**




**1.** A power boost attachment for a three-phase star connected alternating current generator feeding a three-phase rectifier bridge, comprising a series-connected pair of diodes poled in the same direction with a common connection connectable to the center junction of the star connected winding of said generator and their other terminals connectable to positive and negative terminals of said rectifier bridge, so as to contribute to the output of said bridge when said center junction has an alternating voltage, all so constructed that:

said diodes (**20***a*,**20***b*) are mounted respectively on conducting cleat plates (**2***a*,**2***b*);

said conducting cleat plates are held in juxtaposition, except for a gap between them, by being held on the same side of an insulating plate (**3**) to which one connection (**10'**) of each diode penetrates, the other connection (**1***a*) of said diodes being made to the respective conducting plates;

a conducting foil or layer (**4**) is provided on said insulating plate (**3**) flush with the surface thereof on the side opposite said conducting cleat plates (**2***a*,**2***b*) so as to connect electrically the respective terminals of said diodes passing through said insulating plate (**3**);

electrically conducting tubular connection means (**5**) provided with a tubular extension projecting substantially beyond the plane of said insulation plate are provided in said gap, mounted on said insulating plate (**3**), for making electrical connection between said conducting foil or layer (**14**) and said center junction of said star connected winding, and

means (**102***a*, **102***b*) are provided on said conducting cleat plates (**2***a*,**2***b*) to facilitate direct connection of each cleat plate to one terminal of the output of said bridge rectifier.

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**3,866,073**
**COMPOSITE CONFORMABLE SUPPORT STRUCTURE ELEMENT**

**Niko V. Gjaja, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

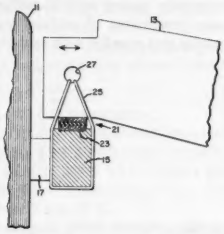
**Continuation of Ser. No. 152,679, June 14, 1971, abandoned. This application May 3, 1973, Ser. No. 356,710**
**Int. Cl. H02k** *5/24;* **B32b** *27/38*
**U.S. Cl. 310—260** **7 Claims**

**1.** In combination with a support system in the end winding region of a dynamoelectric machine, and disposed therein; at least one spacer element for allowing limited movement in the

axial direction and having substantially zero compressibility in the radial direction comprising:

a first relatively thick, incompressible, ply of a resin impregnated felt strip;

a second relatively thick, incompressible ply of a resin impregnated felt strip; and,



a relatively thin, elastomeric sheet disposed between said first and second incompressible plies and bonded thereto, whereby compressive stressing in a plane normal to the element is resisted while movement in the plane of the element is allowed.

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**3,866,074**

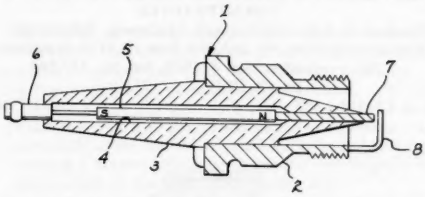
## MAGNETIC SPARK SPREADER

**David A. Smith, R.R. 1, Box 707, Willcox, Ariz. 85643**

**Filed July 23, 1973, Ser. No. 381,898**

**Int. Cl. H01t** *13/42, 13/04*

**U.S. Cl. 313—118** **6 Claims**



1. A spark plug for use in internal combustion engines, said spark plug being electrically connected to a source of periodically generated electrical current discharges, said spark plug comprising in combination:

A. an anode electrode connected to the source of electrical current discharges and said anode electrode extending from one end of said spark plug in juxtaposition with the longitudinal axis thereof;

B. a cathode electrode extending from said one end of said spark plug, said cathode electrode being formed in an L and having a first leg of the L parallel to but laterally displaced from the extending end of said anode electrode and a second leg of the L transverse to but displaced from the extremity of said anode electrode such that a current discharge from the source produces an electrostatic field intermediate said anode and cathode electrodes which field is generally parallel to said anode electrode;

C. an insulator for electrically shielding said anode electrode from said first leg of said cathode electrode;

a bushing for supporting said second leg of said cathode electrode, said bushing being grounded to the internal combustion engine; and

E. a magnet means disposed in proximity to said anode electrode for establishing a magnetic field parallel to said anode electrode and intersecting said second leg of said cathode; whereby, the electrostatic field intermediate said anode and said cathode is parallel with the magnetic field, which fields, in combination, produce an arc streamer having a helical locus and a resulting parabolic arc plasma.

**3,866,075**

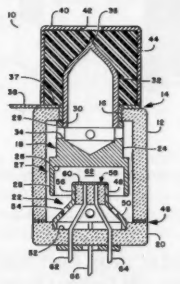
## VACUUM TYPE TRIGGER DISCHARGE TUBE WITH CUP SHAPED ANODE

**John T. Grissom, and Leslie A. Shope, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed May 9, 1974, Ser. No. 468,316**

**Int. Cl. H01j** *19/68*

**U.S. Cl. 313—178** **12 Claims**



1. A long-life trigger discharge tube comprising a gas impervious, generally tubular ceramic body; a ceramic, gas impervious wall sealed to and closing one end of said body; an anode assembly supported at the other end of said ceramic body, said anode assembly including a cup-shaped anode member disposed within said body having a central circular planar portion surrounded by a tubular rim portion extending into said body and facing towards said first mentioned end, an electrically conductive tubular gas impervious member coupling the interior of said body and said anode member through said ceramic body to the exterior thereof, and means for sealing said tubular member to said other end of said ceramic body and for electrically connecting to said anode member through said tubular member; a cathode assembly supported on said ceramic end wall and including a tubular cathode of smaller diameter than said anode member rim portion extending from said wall and terminating partially within and overlapping said anode rim portion spaced from said anode planar portion by a discharge gap, a ceramic cylinder positioned within said cathode having a planar surface facing said anode planar portion and contiguous with the terminating portion of said cathode, a trigger film disposed on said cylinder surface, at least one trigger electrode penetrating said ceramic cylinder to said surface and into at least partial contact with said trigger film, and means for electrically coupling said cathode and said trigger electrode to the exterior of said ceramic body through said wall.

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**3,866,076**

## ELECTRIC DISCHARGE TUBE, COMPRISING A HIGHLY LOADED ANODE

**Hendrikus Willemina Evers, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 23, 1973, Ser. No. 418,583**

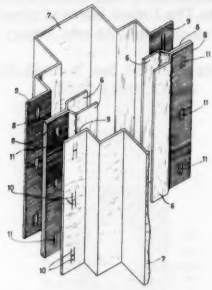
**Claims priority, application Netherlands, Dec. 29, 1972, 7217782**

**Int. Cl. H01j** *1/46, 21/10*

**U.S. Cl. 313—293** **3 Claims**

1. An electronic tube comprising an anode assembled of at least one inner anode member exposed to a higher thermal load and an outer anode member exposed to a lower thermal load, said inner anode member having surface portions placed against corresponding surface portions of said outer anode member and, at a temperature of about 500 degrees centri-

grade, said surface portions of the inner anode member having a coefficient of thermal radiation which exceeds the coefficient of the facing surfaces of the outer anode member by at least 60 per cent.



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**3,866,077**

**ELECTRON EMITTERS**

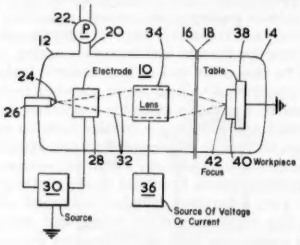
**Francis Sidney Baker, Old Harlow; Charles Richard Harrison, Hovingham; Anthony Raymond Osborn, Hertford, and John Williams, Broxbourne, all of England, assignors to National Research Development Corporation, London, England**

**Filed July 5, 1972, Ser. No. 269,139**

**Claims priority, application Great Britain, July 9, 1971, 32329/71**

**Int. Cl. H01j** *1/16*

**U.S. Cl. 313—336** **11 Claims**




1. An electronic device consisting of an enclosure capable of enclosing a vacuum, a point source which can emit electrons arranged therein, which source consists essentially of at least one carbon filament having an emitting point, emission control means which can cause electrons to be emitted from the source by field emission, and means for receiving said electrons.

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**3,866,078**

**IMAGE ORTHICON**

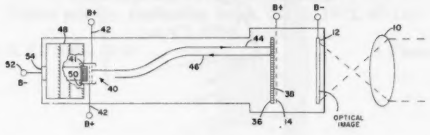
**Ralph L. Norman, 3644 Marymount Dr., N.W., Huntsville, Ala. 35810; Jerry W. Hagood, 307 Mountain Gap Rd., S.E., Huntsville, Ala. 35803, and Joe Shelton, 400 Tatom St., N.W., Huntsville, Ala. 35805**

**Filed Oct. 26, 1973, Ser. No. 409,975**

**Int. Cl. H01j** *31/26*

**U.S. Cl. 313—377** **5 Claims**

1. In an image orthicon tube for converting impinging optical images into video signals, the improvement comprising: an electron gun for emitting an electron scan beam at ambient temperatures, said gun including a field effect electron emitter having several million parallel emitting fibers per square centimeter of emitting surface area, with the emitting ends of said fibers being terminated in a plane across the emitter surface, an insulating oxide encompassing and separating said fibers, and a conductive backing plate adjoining first ends of said fibers for applying an electric potential thereto; a field effect emitter charge carrier matrix target sheet disposed in spatial alignment with said gun, said target including a thin sheet of metal-oxide composite having several million parallel metal fibers per square centimeter of surface area and disposed substantially coaxial and parallel with said electron gun emitting fibers, said metal fibers being disposed normal to the surfaces of said target sheet, an oxide insulator between respective metal fibers for enhancing face-to-face conduction through the sheet and retarding lateral conduction through the oxide, and a thin oxide coating on a first surface of said target sheet for providing secondary electron emission when stimulated by electron impact; and a photocathode disposed in alignment with said first surface of said target sheet, said photocathode emitting photoelectrons toward said target when stimulated by an input optical signal.

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**3,866,079**

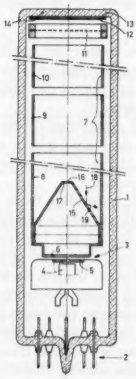
**TELEVISION CAMERA TUBE IN WHICH THE DETRIMENTAL EFFECT OF THE RETURN BEAM IS COUNTERACTED**

**Theodore G. Schut, Emmasingel, Eindhoven, Netherlands**

**Continuation of Ser. No. 265,259, June 22, 1972, abandoned. This application Mar. 4, 1974, Ser. No. 447,563**

**Int. Cl. H01j** *31/38, 25/00*

**U.S. Cl. 313—389** **1 Claim**




1. A television camera tube comprising an evacuated envelope having a radiation transparent end wall, a transparent electrically conductive layer on said end wall, a photoconductive layer on said electrically conductive layer on which a potential distribution is formed on the surface thereof remote from said electrically conductive layer by projecting an optical image on said layer, an electron gun having a cathode spaced from and axially aligned with said photoconductive layer for producing an electron beam, deflection means for scanning said photoconductive layer with the electron beam for period-

ically reducing the potential distribution on the surface of said photoconductive layer to cathode potential, and a hollow cylindrical electrode between the electron gun and the photoconductive layer, said hollow cylindrical electrode having a diaphragm integral therewith with an aperture therein for restricting the cross-section of the electron beam, the surface of said diaphragm facing said photoconductive layer extending away from said layer and forming an acute angle with the axial direction for deflecting returned electrons from said photoconductive layer, said diaphragm being a truncated cone having its smaller end nearer the photoconductive layer.

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**3,866,080**

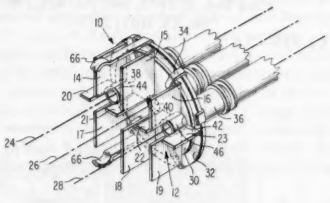
## INLINE ELECTRON GUN HAVING MAGNETICALLY PERMEABLE PLATES FOR ENHANCING CONVERGENCE OF ELECTRON BEAMS

**William Henry Barkow, Pennsauken, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Aug. 8, 1973, Ser. No. 386,639**

**Int. Cl. H01j** *29/76, 31/20, 29/48*

**U.S. Cl. 313—412** **1 Claim**



1. In an inline electron gun for a cathode ray tube including means for generating and directing three electron beams along substantially coplanar paths, the improvement comprising:

four first magnetically permeable plates coplanar with said electron beams and with each other being located at a beam exit from said gun between each of said paths and outwardly of the outermost paths for independently enhancing a magnetic field for deflecting said beams perpendicularly to the plane of said paths; and

six second magnetically permeable plates all perpendicular to the plane of said beams being located at a beam exit from said gun, arranged in parallel pairs, the plates of ech pair being coplanar to each other and each pair having one plate on each side of a beam for independently enhancing another magnetic field for deflecting said beams within the plane of said beams.

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**3,866,081**

## CATHODE RAY GUN HAVING FIRST AND SECOND GRIDS WITH ORTHOGONAL APERTURES

**Jan Hasker, and Jacobus Johannes Maria Joseph De Klerk, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

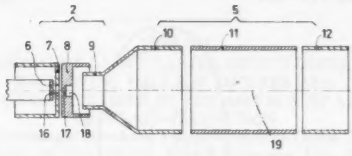
**Filed June 21, 1973, Ser. No. 372,402**

**Claims priority, application Netherlands, June 24, 1972, 7208728**

**Int. Cl. H01j** *29/56, 29/62*

**U.S. Cl. 313—449** **5 Claims**

1. A cathode-ray tube comprising an astigmatic electron gun having centered along an axis: a cathode, a first grid, a second grid and a third grid for producing an electron beam, a focusing lens and a target upon which the electron beam impinges with a narrow elongate spot, said first grid having a narrow elongate aperture the length direction of which is substantially parallel to the vertical scanning direction, so that an astigmatic lens is present in the electron gun for producing a structure of the electron beam in which the same is focused in a point at some distance in front of the target on the side of the electron gun with respect to electron paths in an imaginary plane through the length direction of the spot in the center of the target and the said axis, and is focused substantially on the target with respect to electron paths in a plane through the said axis and at right angles to the length direction of the spot in the center of the target, said second grid having an aperture which, on the side remote from the cathode, widens in the direction of the target and is elongated at substantially right angles to that of said first grid. said aperture



having a dimension which, measured parallel to the direction of the vertical scanning, is smaller than half of the dimension of the aperture in the first grid measured in the same direction, said third grid having an aperture exceeding in size the apertures of said first and second grids, the dimension of the aperture of said second grid in the vertical scanning direction and the distance between the first and second grid being adjusted for intercepting at least 5% of the electron beam by the second grid.

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**3,866,082**

## CATHODE RAY TUBE FOR DISPLAYING COLOURED PICTURES

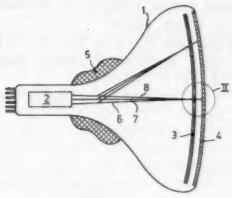
**Piet Gerard Joseph Barten, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 9, 1973, Ser. No. 404,356**

**Claims priority, application Netherlands, Oct. 17, 1972, 7214003**

**Int. Cl. H01j** *29/18*

**U.S. Cl. 313—470** **3 Claims**



1. A cathode ray tube for displaying color pictures comprising a display screen having a plurality of discrete regions which, upon bombardment with electrons, luminesce in three different colours, a color selection mask having a plurality of apertures, and means to produce three electron beams converging towards the display screen, each luminescent region being present in a path of an electron beam through one of said apertures, said luminescent regions being arranged according to substantially parallel color strips, said color strips being arranged in triplets each comprising three color strips which luminescen green, red, and blue, respectively, characterized in that the central color strip of each triplet luminesces red and that, over at least a part of the display screen, the distance between the centers of two adjacent color strips belonging to the same triplet is at either side of the red strip at least 5% larger than the distance between the centers of two adjacent color strips of which one belongs to the said triplet and the other belongs to an adjacent triplet.

**3,866,083**

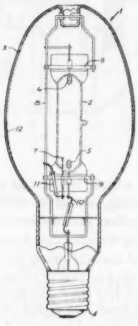
## COLOR RENDITION OF HIGH PRESSURE MERCURY VAPOR LAMP

**Ranajit K. Datta, East Cleveland, and Thomas Luscher, Wickliffe, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 120,511, March 3, 1971, Pat. No. 3,790,490. This application Mar. 5, 1973, Ser. No. 337,903**

**Int. Cl. H01j** *61/44*

**U.S. Cl. 313—487** **4 Claims**



1. A high pressure mercury vapor lamp comprising an inner discharge assembly including an arc tube containing a filling of mercury, a transparent outer envelope surrounding said discharge assembly and spaced therefrom to operate in a temperature range from 200° to 400°C, and a coating of a blend of red-emitting phosphor and a green-emitting phosphor consisting of strontium chlorosilicate activated by divalent europium ($Eu^{2+}$) and doped with divalent manganese ($Mn^{2+}$).

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**3,866,084**

## PLASMA DISPLAY PANEL DEVICE

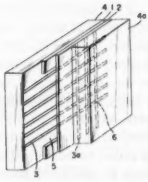
**Koichiro Kurahashi; Hiroshi Tottori, and Fumihiko Isogai, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed June 9, 1972, Ser. No. 261,291**

**Claims priority, application Japan, June 22, 1971, 46-44973; Oct. 28, 1971, 46-100413**

**Int. Cl. H01j** *7/42;* **H01k** *1/60*

**U.S. Cl. 313—510** **3 Claims**



1. A plasma display panel comprising:

a first base plate having an inner surface and an outer surface,

a first electrode disposed adjacent to the inner surface of the first base plate,

a second base plate having an inner surface and an outer surface,

a spacer disposed between the first base plate and the second base plate,

a second electrode disposed adjacent to the inner surface of the second base plate,

the second electrode being further disposed opposite the first electrode and a gap formed therebetween by said spacer,

a continuous insulating layer having an inner surface and an outer surface disposed within the gap,

the gap being otherwise occupied in its entirety by a dischargeable gas,

the first electrode being disposed between the inner surface of the first base plate and the outer surface of the insulating layer,

whereby an electrical discharge of the gas in the gap occasioned by application of a voltage of a given polarity to the first and second electrodes establishes a wall voltage of opposite polarity on the inner surface of the insulating layer.

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**3,866,085**

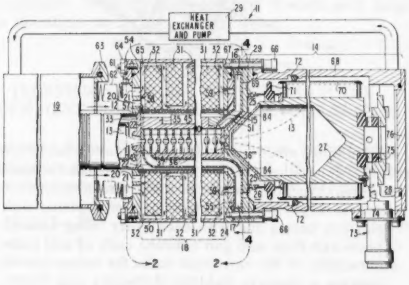
## COLLECTOR POLE PIECE FOR A MICROWAVE LINEAR BEAM TUBE

**Bertram G. James, Redwood City, Calif., assignor to Varian Associates, Palo Alto, Calif.**

**Filed Dec. 3, 1973, Ser. No. 421,196**

**Int. Cl. H01j** *25/34*

**U.S. Cl. 315—3.5** **6 Claims**




1. In a microwave linear beam tube:

electron gun means for forming and projecting a beam of electrons over an elongated linear beam path;

beam collector means at the terminal end of said beam path for collecting and dissipating the energy of the electron beam;

microwave interaction circuit means disposed along said beam path intermediate said electron gun means and said beam collector means for electromagnetic wave interaction with the beam to produce output microwave energy;

electrical solenoid means disposed surrounding said microwave interaction circuit means for generating an axial magnetic field in the beam path for focusing the electron beam through said microwave interaction circuit means;

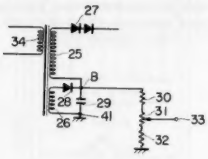
a collector pole piece structure disposed at the beam collector end of said solenoid for shaping the beam focus magnetic field in the region of said beam collector means, said collector pole piece structure being made of a ferromagnetic material and including a chamber therin; at least four passageways from said chamber through said pole piece structure:

an output waveguide structure for coupling the output microwave energy from said microwave circuit to a utilization device; a portion of said chamber containing a length of said waveguide structure, and said waveguide structure passing into and out of said chamber through two of said passageways; another portion of said chamber formed to contain a fluid coolant, and at least two of said passageways disposed for conduction of said fluid coolant into and out of said chamber.

## 3,866,086
## FLYBACK TRANSFORMER APPARATUS

**Keisuke Miyoshi, Katano, and Naoki Shibano, Sakai, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed June 11, 1973, Ser. No. 369,001**
**Int. Cl. H01j 29/70**
**U.S. Cl. 315—411** **7 Claims**

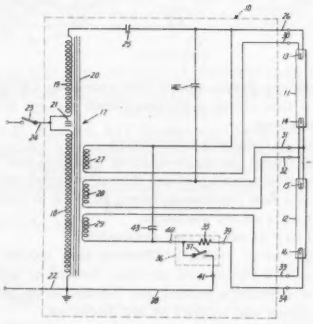



1. A flyback transformer apparatus comprising: a flyback transformer having a primary winding, a first secondary winding and a second secondary winding; at least one first rectifier connected to one end of said first secondary winding; a second rectifier connected between one end of said second secondary winding and the other end of said first secondary winding; and a capacitor connected to said second rectifier in such a manner that said capacitor is charged up by a voltage produced across said second rectifier, wherein the entire primary winding of said flyback transformer is inductively closely coupled with the high-tension side winding portion of said first secondary winding.

## 3,866,087
## BALLAST CIRCUIT WITH INTEGRAL TIME DELAY RELAY

**Walter F. Powell, Danville, Ill., assignor to General Electric Company, Indianapolis, Ind.**

**Filed Mar. 20, 1973, Ser. No. 342,994**
**Int. Cl. H05b 41/14**
**U.S. Cl. 315—97** **10 Claims**



1. A ballast circuit for starting and operating at least one gaseous discharge lamp having spaced apart electrodes, each electrode further comprising a heating element; said circuit including:

a. a transformer having a primary winding and a secondary winding inductively coupled therewith;

b. input leads for connecting the primary winding to a source of electric energy, and output leads connecting the secondary winding to said spaced apart lamp electrodes;

c. auxiliary windings inductively coupled to the primary winding, said auxiliary windings including electrode heating windings connected to said electrode heating elements for providing electric energy to the elements;

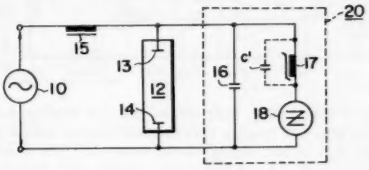
d. a time delay relay including a heater and a normally open switch which closes responsive to thermal energy developed upon energization of the heater, said switch being connected in series with the secondary winding and said lamp electrodes;

e. means connecting the relay heater to an auxiliary winding, said winding providing electric energy to the heater concurrent with application of electric energy to said electrode heating elements by the electrode heating windings.

## 3,866,088
## DISCHARGE LAMP STARTER DEVICE USING A BACKSWING VOLTAGE BOOSTER AND CHARACTERIZED BY THE ABSENCE OF A PREHEATING FUNCTION

**Isao Kaneda, and Kiyokazu Takeuchi, both of Osaka, Japan, assignors to New Nippon Electric Company Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 202,766, Nov. 29, 1971, Pat. No. 3,753,037, which is a continuation-in-part of Ser. No. 14,325, Feb. 26, 1970, Pat. No. 3,665,243. This application Apr. 23, 1973, Ser. No. 353,250**
**Int. Cl. H05b 41/00, 41/14**
**U.S. Cl. 315—105** **19 Claims**




1. For igniting a discharge lamp by the use of a booster oscillating voltage; a starting device characterized by the absence of a preheating function for said lamp, said starting device comprising a series circuit including a power source and a linear inductor connected in series, and a booster adapted for generating said booster operating voltage, said series circuit and booster being respectively connected across said lamp, said power source supplying an operating voltage via said inductor to said lamp, said booster including a capacitance element adapted for oscillation, a saturable non-linear inductance element and a symmetrical switching element in series connection with said non-linear element, said capacitance element being connected across said lamp, said nonlinear inductance element and switching element being connected across said lamp, said non-linear inductance element including a core of magnetic and dielectric material to provide characteristic equivalent capacitance ($c'$) and different inductances ($l_u$ and $l_s$) respectively in the unsaturated and saturated states thereof, a backswing voltage being induced across the non-linear inductance element when said switching element turns off whereby said booster produces a higher voltage than the voltage of said power source during this starting period.

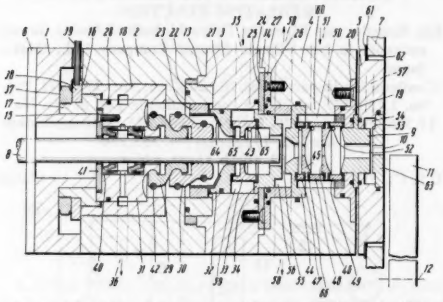
## 3,866,089
## LIQUID COOLED PLASMA BURNER

**Kurt Hengartner, Visp/Valais, Switzerland, assignor to Lonza Ltd., Gampel/Valais, Switzerland**

**Filed Aug. 1, 1973, Ser. No. 384,570**
**Claims priority, application Switzerland, Aug. 16, 1972, 12124/72**
**Int. Cl. H05b 31/26**
**U.S. Cl. 315—111.2** **4 Claims**

1. A liquid stabilized plasma burner assembly comprising, in combination, a hollow cylindrical casing including an inner wall and formed from a plurality of casing rings (1–5) arranged in a coaxially aligned relationship, an electrode chamber defined by at least one (1–3) of said casing rings, first

circular inserts (29, 30) coaxially arranged in said electrode chamber and spaced from said inner wall of said casing, a bar electrode (8) arranged to be surrounded by said inserts and contacted thereby, means (35, 58) for passing a cooling fluid into said casing and through said spacing between said inserts and said inner wall of said casing, an arc discharge chamber defined by at least one other (4) of said casing rings in axial alignment with said electrode chamber, said at least one casing ring (1–3) defining said electrode chamber and said at least one casing ring (4) defining said arc discharge chamber being detachably joined together, second circular inserts (45–49), including orifice plates (45, 46) and intermediate rings (47, 48, 49) provided with tangential passages (52), coaxially arranged in said arc discharge chamber, said second inserts being held tightly together and spaced from said inner



wall of said casing, inlet means (51) for feeding stabilizing liquid into said spacing between said second inserts and said inner wall of said casing, outlet means (57) for passing said stabilizing liquid out from said spacing, said second inserts including two inserts (47, 49) which are associated each with one face of said at least one ring (4) defining said arc discharge chamber and which are centrally and detachably mounted upon said ring, a pair of annular steps (20, 26) formed in opposite faces of said at least one casing ring (4) defining said arc discharge chamber, and at least two retaining rings (27, 19) seated one each in said annular steps (20–26) to mount thereon said inserts (47, 49) associated with said at least one ring (4) defining said arc discharge chamber, with at least one other (48, 46) of said second inserts being coaxially held between said two inserts (47, 49) associated with said at least one ring (4) defining said arc discharge chamber.

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**3,866,090**

**GAS DISCHARGE PANEL AND OPERATING SYSTEM**

**Zeger Van Gelder, and Mathieu Martinus Maria Petrus Matheij, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

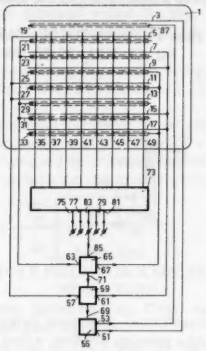
**Filed Oct. 23, 1973, Ser. No. 408,401**

**Claims priority, application Netherlands, Oct. 31, 1972, 7214702**

**Int. Cl. H05b** *37/00*

**U.S. Cl. 315—169 TV** **8 Claims**

1. A gas discharge device comprising a gas discharge panel including a matrix of gas cells, a cathode system including a plurality of parallel spaced electrodes, an auxiliary anode system and an anode system each comprising a plurality of parallel spaced electrodes in which at least part of the electrodes of one of these systems crosses the electrodes of one of the other systems, means for interconnecting at least part of the electrodes of the cathode system in groups, means for connecting each of a number of these groups to a different output of a line scanning control circuit for automatically scanning the panel line by line by means of an auxiliary discharge extending every time along a subsequent electrode of the cathode system, and wherein at least part of the electrodes of the auxiliary anode system extends in the same direction as that of the groups of interconnected electrodes of the cathode system and are likewise interconnected in at least two groups, means for connecting each of a number of these electrode groups of the auxiliary anode system to a different output of



a second control circuit, a third control circuit for selectively energizing the anode electrodes, and means for mutually synchronizing said control circuits.

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**3,866,091**

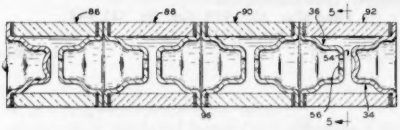
**UNITARY SERIES SPARK GAP WITH ALIGNED APERTURES**

**Chester J. Kawiecki, Santa Barbara, Calif., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.**

**Continuation of Ser. No. 298,014, Oct. 16, 1972, abandoned. This application Nov. 12, 1973, Ser. No. 414,858**

**Int. Cl. H05b** *41/14*

**U.S. Cl. 315—203** **15 Claims**



1. A spark-gap device suitable for providing transient protection to a line above a predetermined voltage level, said device comprising:

a first pair of conductive electrodes,

insulating spacer means positioning said first pair of electrodes with opposed portions thereof in facing relation for defining a first gap therebetween adapted to break down and support an arc discharge,

a second pair of conductive electrodes,

insulating spacer means positioning said second pair of electrodes with opposed portions thereof in facing relation for defining a second gap therebetween adapted to break down and support an arc discharge,

one of said second pair of electrodes being electrically connected to one of said first pair of electrodes for providing a series circuit including said gaps, said device being constructed so that an arc discharge across one gap causes illumination of the other gap,

and a first enclosed chamber substantially separate from the region of said gaps and communicating with the region of said gaps to promote extinguishing of an arc discharge across the said gaps after the cessation of an over-voltage condition across said gaps in series,

wherein said insulating spacer means cooperate with said electrodes to enclose the first and second gaps in second and third separate chambers respectively, said insulating spacer means being joined to the respective pairs of elec-

trodes with which they form chambers to hermetically seal said second and third chambers except for communication with said first chamber.

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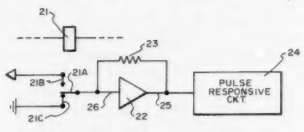
**3,866,092**
**CIRCUIT FOR ELIMINATING CONTACT BOUNCE EFFECT**
**Robert V. Burns, Tinley Park, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**
**Filed Oct. 15, 1973, Ser. No. 406,759**
**Int. Cl. H02h** *7/20*
**U.S. Cl. 317—9 C** **4 Claims**




1. Means for protecting pulse responsive circuits from multiple output signals caused by the bounce of mechanically operated switching contacts, comprising: a gain producing device comprising an amplifier including, an input alternately connectable through mechanically operable switching contacts to a source of signals of a first characteristic, and a source of signals of a second characteristic, and an output connectable to a pulse responsive circuit, said gain device initially operated in response to connection through said contacts to said source of signals of said first characteristic, to produce at said output a single signal of said first characteristic, and further operated in response to connection through said contacts to said source of signals of said second characteristic to produce at said output a single signal of said second characteristic; and a feedback circuit connected from the output to the input of said gain device, said feedback path maintaining said gain device operated to continue production of a single signal at said output of said gain device, of the same characteristic as that of the signal source last connected to said gain device input.

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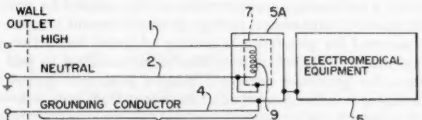
**3,866,093**
**LOW LEAKAGE ELECTRICAL POWER INPUT CIRCUIT FOR ELECTROMEDICAL AND OTHER SIMILAR APPARATUS**
**Norbert L. Kusters, 817 Eastbourne Ave., and Malcolm P. MacMartin, 45 Oriole Dr., both of Ottawa, Ontario, Canada**
**Filed Sept. 17, 1973, Ser. No. 398,207**
**Claims priority, application Canada, Sept. 18, 1972, 151921**
**Int. Cl. H02h** *3/16*
**U.S. Cl. 317—18 R** **18 Claims**




1. A low leakage power input circuit for electromedical or other electrical equipment having an electrical power element and where the leakage current from the supply circuit to a grounding circuit should be very small comprising:

a. a power cord made up of a high line, a neutral line, and a grounding conductor, said high and neutral lines adapted for connection at one end to an electrical power source and said neutral and grounding conductor adapted for connection at the same end of the power cord to electrical ground,

b. said high and neutral lines connected at the power end of the power cord to the electrical power element of the electrical equipment,

c. a first guard means ecnlosing the electrical power element of the electrical equipment and connected to the neutral line, and

d. a second guard in the form of a conducting metal enclosure, enclosing the first guard and insulated therefrom, and connected to the said grounding conductor.

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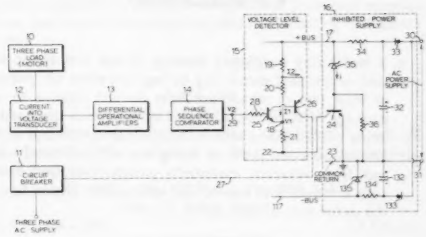
**3,866,094**
**INHIBITED POWER SUPPLIES**
**David Richard Boothman, Ennismore, and David Walter Nutt, Peterborough, Ontario, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Ontario, Canada**
**Filed May 21, 1973, Ser. No. 362,048**
**Claims priority, application Canada, Oct. 26, 1972, 155043**
**Int. Cl. H02h** *3/24*
**U.S. Cl. 317—31** **6 Claims**




1. In a fault detection circuit used for rotecting electrical apparatus against overvoltges, the combination comprising:

a voltage level detector for comparing a reference voltage and a monitored voltage, said voltage level detector producing an overvoltage signal in response to a predetermined difference between said reference voltage and said monitored voltage;

a power supply for providing said reference voltage comprising Ac input terminals, a rectifier connected to said terminals for converting alternating current into unidirectional current, capacitance means connected to the output of said rectifier for smoothing out said unidirectional current and establishing a level of DC voltage, and

a vooltage regulator connected to said capacitance means for producing sai reference voltage of lower value than said DC voltage level;

ormally "off" electroic switching means connected to be turned "on" by said reference voltge; and

means coupling said switching means to said voltage level detector for inhibiting the production of said over-voltage signal when said reference voltage falls below a predetermined voltage level.

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**3,866,095**
**PLASTIC ENCASED COMPONENT WITH REFLOWED-PLASTIC SEALED LEADS**
**H. Stephen Marmorek, Toronto, Ontario, Canada, assignor to Sprague Electric Company, North Adams, Mass.**
**Filed July 13, 1973, Ser. No. 379,021**
**Int. Cl. H01g** *9/00*
**U.S. Cl. 317—230** **6 Claims**

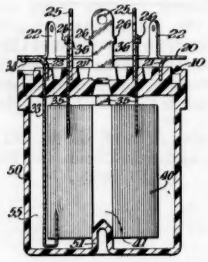
1. A sealed electrical component package comprising:

a. an electrical component having two or more leads;

b. a thermoplastic cover having holes through which said leads pass from an inner face of said cover to and projecting from an outer face of said cover, said leads being directly sealed therein;

c. metal terminals, each lying essentially adjacent to and essentially parallel with one of said leads, an end of each said terminal being embedded in said outerside of said cover, each said terminal being electrically connected to said adjacent lead in a region outside said cover;

d. a thermoplastic housing containing said component and an air space, said housing having an open side into which said cover is sealed; and



e. a metal ring positioned outside of and concentric with said cover, said metal ring having extended tab portions at least two of which are bent inward relative to said package with the ends of said at least two tab portions being embedded in said thermoplastic cover, one of said inward bent tab portions being one of said metal terminals lying adjacent, essentially parallel with and electrically connected to one of said leads in the region beyond the outer face of said cover.

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**3,866,096**

## CHARGING PHOTOCONDUCTIVE MEMBRANES

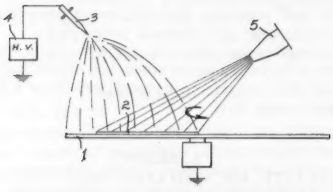
**Kenneth A. Metcalfe, Lockleys, and Alwin S. Clements, Largs Bay, both of Australia, assignors to The Commonwealth of Australia Care of The Secretary Department of Supply, Parkes, Canberra, Australia**

**Filed Sept. 26, 1973, Ser. No. 401,105**

**Claims priority, application Australia, Sept. 28, 1973, 0628/72**

**Int. Cl. G03g** *15/02*

**U.S. Cl. 317—262 A** **6 Claims**




1. A method of charging photoconductive membranes which comprise applying a corona-producing voltage between a corona discharge electrode and a base electrode, interposing near the base electrode a photoconductive membrane to be charged, and simultaneously directing a gas stream onto the photoconductive membrane in counterflow to charged particles tending to be rejected from the charged area, and also to permeate the gas layer at the interface, whereby there is a greater charge retention and secondary ion formation at the surface being charged.

**3,866,097**

## CONTROL APPARATUS FOR INDUCTION MOTOR

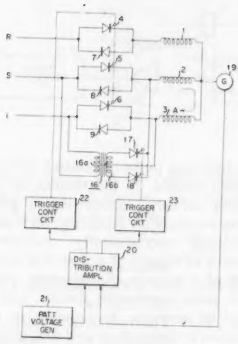
**Nobuo Anzai, and Narihiro Terazono, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 6, 1973, Ser. No. 385,801**

**Claims priority, application Japan, Aug. 10, 1972, 47-93801**

**Int. Cl. H02p** *3/20*

**U.S. Cl. 318—212** **4 Claims**

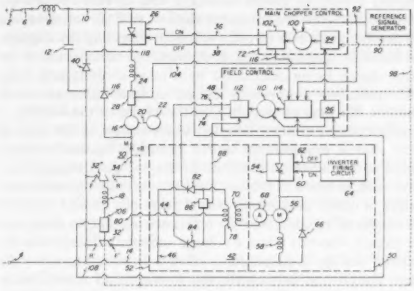



1. A control apparatus for controlling a polyphase induction motor, comprising in combination, a source of polyphase alternating current, one main trigger controllable electric valve connected to each of a plurality of phases of said source between said source and said polyphase induction motor, a single-phase transformer including a primary winding connected across said source and a secondary winding having a center tap connected to one of the phases of said induction motor, a pair of controlling trigger controllable electric valves connected to both ends of said secondary transformer winding with the same polarity, respectively, and having respective output terminals connected together to another phase of said induction motor, motor ignition circuits connected to said main electric valves and to said controlling electric valves to control firing angles of the associated electric valves respectively, a tachometer generator operatively coupled for sensing the speed of said motor, pattern generator means operatively connected for generating a pattern of speed instruction for said motor, distribution amplifier means coupled to said tachometer generator and said pattern generator means for detecting a difference between an output from said tachometer generator and an output from said pattern generator means and producing an output dependent upon the detected difference and operatively coupled to said ignition circuits for applying its output to said ignition circuits for said main electric valves when said pattern generator means is higher in output than said tachometer generator and applying said output to said ignition circuits for said controlling electric valves when said pattern generator means is less in output than said tachometer generator, whereby said induction motor is controlled in accordance with the output from said pattern generator means and by continuously changing a voltage applied to said motor.

## 3,866,098
## ELECTRICAL MOTOR DRIVE SYSTEM WITH FIELD CONTROL OPERABLE IN MOTORING AND BRAKING MODES

**Earnest Franklin Weiser, Erie, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Jan. 14, 1974, Ser. No. 433,409**
**Int. Cl. H02p** *5/06*
**U.S. Cl. 318—251** **21 Claims**




**1.** A drive system wherein d-c electric motor means comprising armature and field means are coupled to a mechanical load to drive the load in a motor mode and to be driven by the load in a braking mode so as to generate armature current dissipated in a braking load circuit and retard motion of the load, comprising:

a. a source of d-c energy having first and second conductors;

b. armature means and field means;

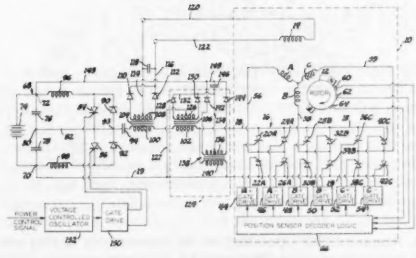
c. motor-brake switching means coupled in circuit between said armature and field means to connect said field and armature means in a series circuit with said source only during the motor mode;

d. power conversion means having its output coupled to shunt said field means and operable in inversion or rectification modes to selectively shunt armature current from said field means during the motoring mode to provide field weakening, and to provide excitation current to said field means during the braking mode.

## 3,866,099
## MOTOR POWER SUPPLY SYSTEM

**Frank J. Bourbeau, Santa Barbara, Calif., assignor to General Motors Corp., Detroit, Mich.**

**Filed Aug. 1, 1973, Ser. No. 384,604**
**Int. Cl. H02k** *29/00*
**U.S. Cl. 318—254** **4 Claims**

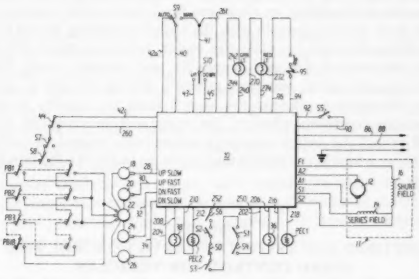



**1.** A motor power supply system comprising, a motor having a polyphase winding and a rotor, a field winding for said motor operative when energized by direct current to provide magnetic poles on said rotor, a switching circuit comprised of a plurality of controlled rectifiers, said switching circuit having input terminals and output terminals connected with said polyphase motor winding, means for causing groups of said controlled rectifiers of said switching circuit to be gated conductive in a predetermined sequence as a function of rotor position to thereby provide current paths for energizing said polyphase winding in a predetermined polyphase sequence, each group of controlled rectifiers when gated conductive defining a full-wave rectifier circuit that is operative to apply a direct voltage to predetermined phases of said polyphase winding, the switching frequency of said controlled rectifiers being a function of rotor speed, a source of direct voltage, inverter means having an input connected to said source of direct voltage and having an output circuit, said inverter means providing a variable frequency alternating output voltage at its output circuit, a circuit connecting the output circuit of said inverter means to said input terminals of said switching circuit including coupling capacitor means connected in series between said inverter means and said switching circuit, means for varying the frequency of the alternating output voltage of said inverter means whereby the reactance of said coupling capacitor means is varied as a function of the output frequency of said inverter means to thereby control the amount of power supplied to said switching circuit from said inverter means, and means for energizing said field winding with direct current.

## 3,866,100
## UNIVERSAL MOTOR CONTROL

**Daniel P. Palenchar; Wayne H. Lehker, and David P. Lock, all of Marietta, Ohio, assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed May 30, 1973, Ser. No. 365,241**
**Int. Cl. G05b** *11/14*
**U.S. Cl. 318—257** **12 Claims**




**1.** A motor control circuit for controlling a motor having an armature and a series field winding, said motor control circuit comprising:

a source of full wave rectified AC voltage;

means connecting said armature and said series field winding in series across said source of voltage, said means including gating means for selectively connecting said source and said armature so that current may flow through said armature in a first or second direction;

comparator means responsive to a reference voltage and feedback signal for producing output pulses each having a duration proportional to the difference in magnitude of the signals being compared;

means responsive to said source for applying a reference voltage to said comparator means;

feedback means responsive to a signal from said motor representing motor speed for applying a feedback signal to said comparator means;

logic circuit means including means for selectively generating a first and second direction command; and,

phase controller means responsive to said source, said comparator, and said direction commands for selectively producing phase control pulses;

said gating means being responsive to said phase control pulses and said direction commands for selectively connecting said source and said armature.

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**3,866,101**

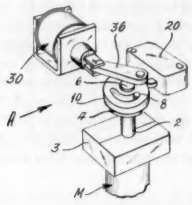
**TIMING APPARATUS**

**Norman J. Burzen, Pacific, Mo., assignor to Nordon Industries-,Inc., Fenton, Mo.**

**Filed Dec. 17, 1973, Ser. No. 425,525**

**Int. Cl. H01h *43/10***

**U.S. Cl. 318—487** **14 Claims**




**1.** A timing apparatus comprising: a motor; a switch for controlling the motor, the switch having a standby condition wherein the motor does not operate and an actuated condition wherein the motor does operate; a shaft rotated by the motor; switch actuating means rotated in one direction away from an initial position for causing the switch to change from its standby condition to its actuated condition and for thereafter permitting the switch to change back to its standby condition, the switch actuating means being rotatable independently of the shaft in said one direction and also rotatable by the shaft in said one direction; an abutment fixed rigidly with respect to the shaft and engageable with the switch actuating means for enabling the shaft to rotate the switch actuating means when the abutment is engaged therewith; and starting means for rotating the switch actuating means a limited amount in said one direction to change the switch from its standby to its actuated condition, whereby the motor will be energized and will propel the switch actuating means back toward its initial position wherein the switch may again be in its standby condition.

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**3,866,102**

**METHOD AND SYSTEM OF SERVO CONTROL FOR SPEED CONTROL FOR VEHICLES**

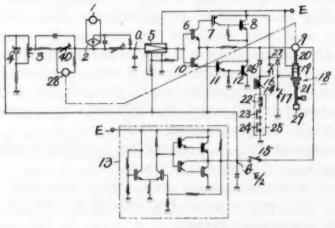
**Hiroshi Hashimoto; Tetsuo Abe, and Masao Suzuki, all of Aichi-ken, Japan, assignors to Sanyo Machine Works Ltd., Aichi-ken, Japan**

**Continuation of Ser. No. 79,772, Oct. 12, 1970, abandoned.**

**This application Aug. 1, 1973, Ser. No. 384,694**

**Int. Cl. G05b *11/36***

**U.S. Cl. 318—609** **3 Claims**



**1.** A system for speed control for vehicles, comprising means for producing d-c voltage proportional to the speed of a running vehicle, means for producing d-c voltage proportional to a desired pre-selected vehicle speed, said voltages being electrically connected with each other in mutually opposite polarity relationship, means to compare a difference in voltage between the two, a servo amplifier electrically coupled at its input end to said voltage comparison means, a servomotor electrically coupled by a driving circuit with the output end of said servo amplifier to drive said servomotor, said driving circuit being changed over by transistors operable depending upon the polarity of the output from said servo amplifier, a control clutch having a coil circuit operatively connected between the rotatable shaft of said servomotor and the rotatable shaft of a throttle valve for effecting the engagement and disengagement therebetween, the coil circuit of the control clutch being controlled by a relay circuit, said relay circuit including a normally closed contact adapted to be opened at the time of stepping on the brake of the vehicle, a normally opened contact adapted to be closed at the time of vehicle clutch engagement and a normally opened contact adapted to be closed at the time of the top-gear engagement of said vehicle when in motion, said contacts being connected in series, a diode positioned in said relay circuit and adapted to be rendered conductive by a reference voltage to drive said relay circuit whereby when a voltage substantially equal to the reference voltage is obtained, a relay is actuated to drive the control clutch and henceforth the forward and reverse rotation of the servomotor increases or decreases to the degree corresponding with the opening of the throttle valve to accelerate or decelerate the vehicle until the vehicle speed is equal to the desired speed, said system further including a comparison circuit operatively associated with the voltage producing means of the set vehicle speed and the voltage producing means of the vehicle running speed to compare the set vehicle speed and the running vehicle speed with each other and to produce a deviation voltage therebetween, comparing said deviation voltage with a changeover reference voltage, adjusting a minor feedback circuit on the basis of the result of such comparison so that when the speed difference therebetween is great, a speed feedback constant effective to increase the rotational speed of the servomotor is selected and when the speed difference is small, a speed feedback constant effective to decrease the rotational speed of the servomotor is selected.

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**3,866,103**

**SERVOAMPLIFIER DEVICE**

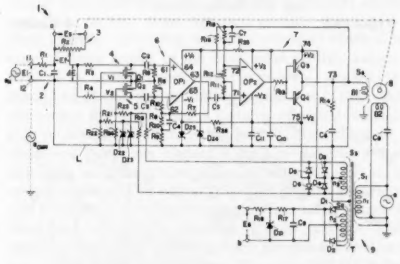
**Keizo Maezawa, and Susumu Ohta, both of Tokyo, Japan, assignors to Yokagawa Electric Works, Ltd., Tokyo, Japan**

**Filed Aug. 10, 1972, Ser. No. 279,433**

**Claims priority, application Japan, Aug. 25, 1971, 46-64961**

**Int. Cl. G05f *1/00, 11/12***

**U.S. Cl. 318—678** **7 Claims**



**1.** Apparatus for operating an AC servomotor having control and exciting coils, the apparatus being arranged to accept an AC power signal from an AC power source and arranged to accept a DC input signal and to control the AC servomotor therewith through a transformerless control circuit having reduced susceptibility to errors due to noise, comprising:

a common potential reference line;

an input circuit for comparing the DC input signal with a feedback signal controlled by the servomotor to obtain a difference signal referred to the common potential line and including chopper means balanced about the common potential line for converting the difference signal into two 180° out of phase signals referred to the common potential line and having amplitudes varying with the amplitude of the difference signal;

a differential-input voltage amplifier having two differential inputs balanced about the common potential line and receiving the two AC signals on the two differential inputs and combining them into an AC output signal with amplitude and phase varying with the amplitude of the difference signal;

a power amplifier for amplifying the output of the voltage amplifier to produce a signal referred to the common potential line to be applied to the control coil of the AC servomotor for driving the AC servomotor;

power transformer means for coupling the AC power source to the servomotor exciting coil to isolate the AC power source from the servomotor exciting coil and to apply a signal to the exciting coil in phase with the AC power source signal, and

means connected to the AC power source and including a 90° phase shifting circuit for operating the chopper means 90° out of phase with respect to the AC power source signal,

whereby AC input noise signals and common mode noise signals are effectively elminated without an isolating transformer between the input circuit and the servomotor, and whereby safe operation of the servomotor is afforded.

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**3,866,104**

## FIVE PHASE STEPPING MOTOR

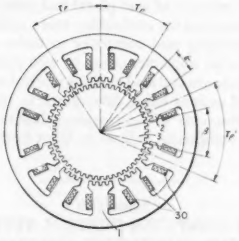
**Gunter Heine, Lahr, Germany, assignor to Gerhard Berger Fabrik Elektrischer Messgerate, Lahr, Germany**

**Filed July 16, 1973, Ser. No. 379,223**

**Claims priority, application Germany, July 18, 1972, 2235086**

**Int. Cl. H02k** *37/00*

**U.S. Cl. 318—696** **20 Claims**



**1.** A five phase stepping motor system, comprising a stepping motor having five untapped stator windings connected said stator windings forming a plurality of connecting points, a permanent magnet rotor, control means connected to said five connecting points for energizing said windings, said stepping motor including $u$ groups each having five main poles, each of said main poles having $n + 1$ pole teeth, said stator windings being distributed on said groups and poles, said poles being divided in accordance with the relations

$$\tau_p = n\,\tau_z + \alpha\; i\;\alpha = \tau_z(K + 0.6)$$

$$\tau_p' = n\,\tau_z + \beta\; i\;\beta = \tau_z(K' + 0.6),$$

the ratio of rotor tooth widths to stator tooth widths at the outer diameter of the rotor being equal to or smaller than unity, the number of rotor teeth $T_r$ corresponding to the relationship $T_r = u(5n + 4K + K' + 3)$, where $\tau_p$ is the pitch of adjacent main poles, $\tau_z$ is the pitch of adjacent pole teeth, $\alpha$ is the angle between adjacent pole teeth on adjacent poles, $\tau_p'$ is the pitch between adjacent poles on adjacent groups, $\beta$ is the angle between adjacent pole teeth on adjacent groups and $n$, $K$, and $K'$ are whole numbers equal to or greater than 0.

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**3,866,105**

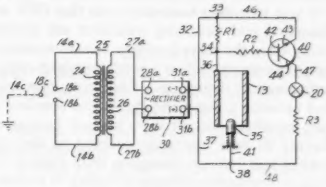
## BATTERY-RECHARGING DEVICE FOR INDICATING LAMP

**Helmut A, Heine, Upper Barvia, Germany; Irving A. Speelman, Roslyn Heights, N.Y., and Otto H. Schmidt, Herrsching Upper Barvia, Germany, assignors to Optotechnik Heine KG, Germany and Propper Manufacturing Company, Inc., Long Island City, N.Y.**

**Filed Apr. 13, 1973, Ser. No. 351,049**

**Int. Cl. H02j** *13/00*

**U.S. Cl. 320—48** **7 Claims**



**1.** A battery-recharging device comprising, in combination, support means operable to receive and support a rechargeable electrical battery having a pair of opposite polarity terminals, and including respective contact means engageable with the battery terminals; a source of DC potential for applying a charging potential; a first circuit connected to said source and to said contact means and operable to apply said DC charging potential across a battery then in said support means; a second circuit connected to said DC potential source in parallel with said first circuit and including a normally open switch means serially connected to a light-emitting device and a current limiting resistor, said limiting resistor limiting the current flow through said light emitting device to a value less than the rated current flow thereof but sufficient to effect illumination of said light emitting device, said normally open switch means including a transistor having a base, an emitter and a collector, and switch operating means in said first circuit connected to said normally open switch means and operable to close said normally open switch means, said switch operating means supplying a bias current to the base of said transistor, to trigger said transistor conductive, responsive to flow of battery-charging current in said first circuit.

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**3,866,106**

## VOLTAGE REGULATOR WITH PROTECTION CIRCUIT FOR AN ALTERNATING CURRENT GENERATOR

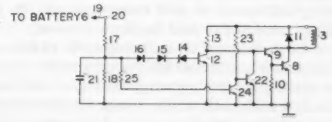
**Yasuo Taguchi, and Takehiro Shimonaka, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan**

**Filed June 21, 1973, Ser. No. 371,956**

**Claims priority, application Japan, June 23, 1972, 47-62937**

**Int. Cl. H02j** *7/24*; **H02h** *7/06*; **H02p** *9/30*

**U.S. Cl. 320—64** **4 Claims**




**1.** An output voltage regulator for an alternating current generator comprising:

a main rectifying circuit for obtaining direct current voltage for battery charging by rectifying alternating current generated in said generator;

an auxiliary rectifying circuit having an output terminal for supplying exciting current to the field winding of said generator;

a switching circuit having at least one switching transistor connected in series between said field winding and ground;

a sensing circuit having two serially connected voltage dividing resistors coupled between the charging terminal of the battery and ground;

a control circuit including a control transistor having a base electrode coupled to the juncture of said voltage dividing resistors, a collector electrode coupled to the output terminal of said auxiliary rectifying circuit via a first biasing resistor and to the base electrode of said switching transistor and an emitter electrode coupled to ground, said control circuit being operative to control the conductivity of said switching transistor such that OFF and ON conditions of said switching transistor are attained respectively when the sensed voltage on said sensing circuit exceeds and remains below a predetermined value; and

a protection circuit including a first protection transistor coupled between ground and the output terminal of said auxiliary rectifying circuit via a second biasing resistor and having its base electrode coupled to the charging terminal of said battery through a third biasing resistor, and a second protection transistor having its collector and emitter electrodes coupled between ground and the base electrode of said switching transistor and its base electrode coupled to the collector electrode of said first protection transistor.

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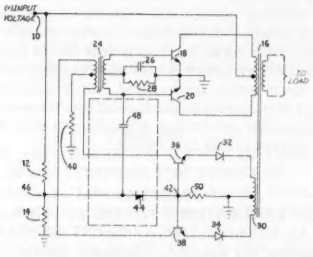
## 3,866,107
## STARTING CIRCUIT FOR INVERTER

**Benjamin Chandler Shaw, Granada Hills, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.**

**Filed Jan. 28, 1974, Ser. No. 437,451**
**Int. Cl. H02m** *1/08*
**U.S. Cl. 321—45 S** **12 Claims**




1. In an inverter circuit including a main transformer having a primary winding connected to an input voltage source, a secondary winding and a feedback winding;

a pair of main switching transistors connected to said primary winding, and

a saturating feedback transformer having its secondary winding connected to said transistors and its primary winding connected to said feedback winding;

an improved starting circuit including a pair of drive switching transistors connected between the ends of said feedback winding and the primary winding of said saturating feedback transformer, and a voltage responsive semiconductor switching means connected between said source and said drive switching transistors to prevent said drive switching transistors from conducting until said source reaches a desired value and to then cause said drive switching transistors to conduct when said source exceeds said desired value.

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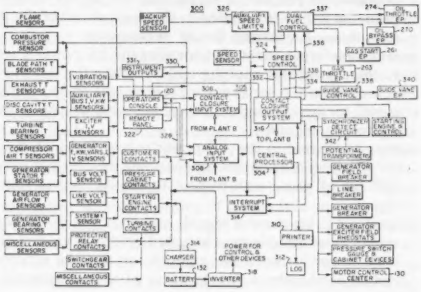
## 3,866,108
## CONTROL SYSTEM AND METHOD FOR CONTROLLING DUAL FUEL OPERATION OF INDUSTRIAL GAS TURBINE POWER PLANTS, PREFERABLY EMPLOYING A DIGITAL COMPUTER

**Robert A. Yannone, Alden, and Roy W. Kiscaden, Springfield, both of Pa., assignors to Westinghouse Electrical Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 205,261, Dec. 6, 1971, abandoned. This application Nov. 29, 1972, Ser. No. 310,520**
**Int. Cl. H02p** *9/04*
**U.S. Cl. 322—14** **13 Claims**



1. A gas turbine electric power plant comprising a gas turbine having a compressor and combustion and turbine elements, a generator having a field winding and being coupled to said turbine for drive power, a fuel system having plural subsystems for supplying one or more fuels to the gas tubrine combustion element, means for exciting said generator field winding, a control system including a digital computer and an input/output system therefor, a plurality of sensors disposed to monitor selected turbine parameters, said plurality of sensors comprising at least an arrangemnt of fuel pressure sensors, said plurality of sensors providing control system inputs representative of said turbine parameters, means for selectively operating one or more of said plural fuel subsystems to energize said turbine, and for controlling said exciting means, and means for operating said computer to make control action determinations for implementation by said plural fuel subsystem operating means and said exciting control means, said fuel system control actions being determined in response to time varying combinations of said sensors inputs, each of said combinations comprising at least an input from said fuel pressure sensors.

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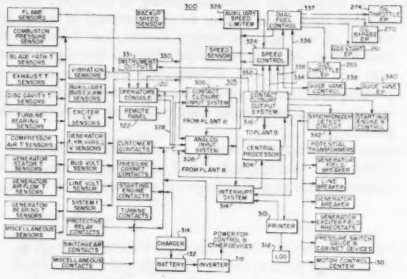
## 3,866,109
## DIGITAL COMPUTER CONTROL SYSTEM AND METHOD FOR MONITORING AND CONTROLLING OPERATION OF INDUSTRIAL GAS TURBINE APPARATUS EMPLOYING EXPANDED PARAMETRIC CONTROL ALGORITHM

**Terry J. Reed, Latrobe, and John F. Reuther, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 189,633, Oct. 15, 1971,. This application Jan. 26, 1973, Ser. No. 326,718**
**Int. Cl. F01d** *21/14*
**U.S. Cl. 322—15** **19 Claims**

1. A gas turbine electric power plant comprising a gas turbine having compressor and combustion and turbine elements, a generator having a field winding and being coupled to said gas turbine for drive power, a fuel system for supplying fuel for said gas turbine combustion elements, means for exciting said generator field winding, a control system includ-

ing a digital computer and an input/output system therefor, a plurality of sensors disposed to monitor selected turbine parameters and to provide control system inputs representative thereof, means for operating said fuel system to energize said turbine and for controlling said exciting means, means continuously responsive to a control system output for modulating air flow into said compressor, and means for operating said



computer to make functionally independent control action determinations for implementation by said fuel system operating means, said exciting means and said air flow modulating means, said modulating means and said fuel system control actions being determined as some function of time varying combinations of control parameters whose values are determined in response to said sensor inputs.

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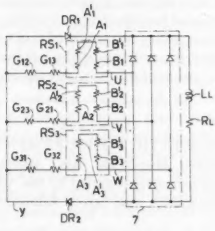
**3,866,110**

## ELECTRICAL GENERATION AND CONTROL DEVICE

**Luigi Ruggeri, Milan, Italy, assignor to Ercole Marelli & C. S.p.A., Milan, Italy**

**Filed Nov. 13, 1973, Ser. No. 415,374**
**Claims priority, application Italy, Nov. 17, 1972, 31806/72**
**Int. Cl. H02k** *11/00*
**U.S. Cl. 322—57** **7 Claims**



1. An electric generation and control device comprising:

a. an inductor, the influence area of whose flux is such as to involve at a time at least two contiguous phases simultaneously in the magnetic armature circuit;

b. an armature having a double winding with at least three phases arranged on a magnetic stack of armature, each phase consisting of:

a generating winding arranged so that the cyclical variations of the inductor flux induce an AC voltage therein;

a smoothing and control winding electrically in series relationship with said generation winding and both electrically and mechanically phase shifted in advance with respect thereto, said smoothing and control winding being formed by at least two turns in series as wound on the two columns of at least a closed saturable core identified in the armature magnetic stack, said columns having such a cross-section and arrangement as to be cyclically saturable by the inductor flux, the spirals wound on said columns having such directions as to produce mutually additive fluxes, but the one additive and the other subtractive with respect to the inductor flux, the saturable cores of contiguous phases being magnetically coupled one to the other by bridges of a magnetic material arranged so as to connect said cores mutually in parallel with respect to the inductor flux during the saturation stage of the same cores by the inductor flux.

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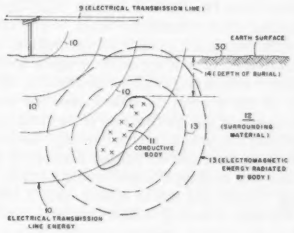
**3,866,111**

## METHOD OF MINERAL EXPLORATION BY DETECTING ELECTROMAGNETIC ENERGY AT POWER LINE FREQUENCY

**Roy K. Warren, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.**

**Filed July 18, 1973, Ser. No. 380,518**
**Int. Cl. G01v** *3/08, 3/12*
**U.S. Cl. 324—3** **1 Claim**



1. A method for exploring for a subterranean electrically conductive massive sulfide body in which induced electromagnetic energy is measured comprising the steps of:

measuring induced electromagnetic energy at selected horizontally spaced apart, aligned station locations only at the frequency, or harmonic thereof, of electrical power current being transmitted over an electrical power line capable of inducing a measurable electromagnetic field in said conductive body, said measurements being made in three coordinate directions X and Y and Z, each coordinate direction being perpendicular to the other, said X and Y and Z directions being, respectively, transverse and parallel and vertical to said conductive body; and

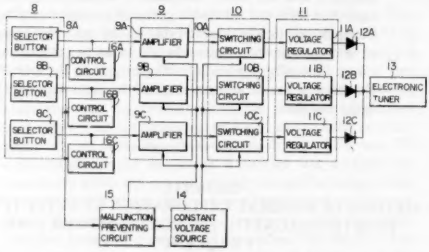
plotting said measurements against the station locations to produce an X curve and a Y curve and a Z curve to provide indications of the locations of said conductive body.

## 3,866,112

## CHANNEL SELECTING APPARATUS FOR TELEVISION RECEIVER HAVING MEANS TO CUT OFF AMPLIFYING TRANSISTOR FOR PREDETERMINED TIME

Kanji Yokoyama, Yokohama, and Hiroyuki Matsuo, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 11, 1974, Ser. No. 441,355
Claims priority, application Japan, Feb. 10, 1973, 48-16876
Int. Cl. H03j 5/04
U.S. Cl. 334—15 2 Claims




1. A channel selecting apparatus for a television receiver, comprising an electronic tuner for selecting a channel depending on the amount of the tuning voltage supplied to the input terminal thereof, a plurality of channel selecting buttons on which a signal is induced by being touched by a hand, a plurality of amplifying circuits each connected to each of the channel selecting buttons, a plurality of switching circuits each connected to each of the amplifying circuits, a plurality of voltage regulators each connected to the output terminal of each of the switching circuits, a plurality of reverse voltage blocking diodes each connected to the output terminal of each of the voltage regulators, means for connecting the output terminal of each of the reverse voltage blocking diodes to the input terminal of the electronic tuner, a plurality of control circuits each connected to each of the channel selecting buttons for deriving a part of the induced signal to effect control, a malfunction preventing circuit connected to all of the output terminals of the control circuits, means for connecting the output terminal of the malfunction preventing circuit to all of the amplifying circuits, a constant voltage source, and means for connecting the constant voltage sources to the switching circuits and the malfunction preventing circuit, whereby the amplifying circuit and the switching circuit connected to a desired channel selecting button are activated by a signal induced on the desired channel selecting button to supply an output of the constant voltage source to the voltage regulator connected to the latter switching circuit to adjust the voltage which is supplied through the corresponding reverse voltage blocking diode to the input terminal of the electronic tuner, while the malfunction preventing circuit is activated by the induced signal supplied thereto through the corresponding control circuit to produce, after the lapse of a constant time, a voltage sufficient for cutting off the amplifying circuits which is supplied to the amplifying circuits in a reverse-biassing manner.

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## 3,866,113

## TEST INSTRUMENT FOR IGNITION SYSTEMS

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

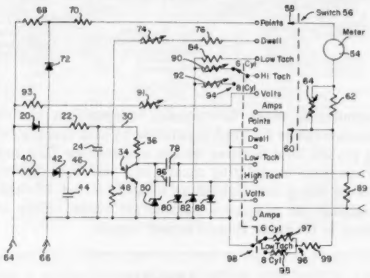
Filed Aug. 6, 1973, Ser. No. 385,823
Int. Cl. F02p 17/00
U.S. Cl. 324—16 R 4 Claims

1. In a test instrument adapted for use in the measurement of ignition systems of the type wherein a battery is series coupled with the primary winding of a spark coil and a switching device such that pulses of current flow from the battery through the coil winding during periods a current path is provided through the switching device, a circuit arrangement comprising:

voltage supply means, having an input circuit adapted for being coupled across said coil winding and having an output circuit, for converting a portion of the energy of the current pulses which flow through said coil winding into a direct current output voltage across said output circuit;

a circuit including a transistor having its collector terminal coupled through a resistor to one terminal of the output circuit of said voltage supply means; and base, emitter bias means adapted for responding to the signal across said coil winding, for biasing said transistor on during periods said current pulses are applied through said coil windings and for biasing said transistor off during other periods;

voltage level clamping means, coupled across the collector terminal of said transistor and said other terminal of the output circuit of said voltage supply means, for maintaining the voltage thereacross at a substantially fixed predetermined amplitude value during the periods said transistor is biased off;




signal processing means coupled across the collector of said transistor and said other terminal of said voltage supply means and responsive to the voltage thereacross, for providing signal current pulses whose average value is indicative of the number of current pulses per unit of time applied through said coil winding;

a meter adapted for providing an indication of the average value of current signals applied thereto; and

switching means for selectively coupling said meter to receive the signal current pulses from said signal processing means, whereby an indication of the number of current pulses per unit of time applied through said coil winding is provided, and for selectively coupling said meter across the base and emitter terminals of said transistor, whereby an indication is provided of the percentage of time current pulses are applied through said coil winding.

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## 3,866,114

## ELECTROSTATIC MEASUREMENT SYSTEM

James E. Johnston, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 15, 1973, Ser. No. 370,255
Int. Cl. G01r 5/28, 31/12
U.S. Cl. 324—32 2 Claims

2. Apparatus for use in determining the electrostatic properties of a dielectric, comprising:

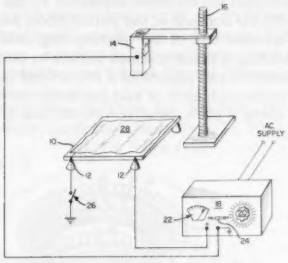
a. a contact plate insulated from electrical ground for contacting and supporting a sheet of dielectric to be tested;

b. a D.C. potential source;

c. a two-state selectively operable switch;

d. means interconnecting the plate, the potential source, the electrical ground and the switch so that in its first state, the switch holds the plate at a fixed potential relative to the electrical ground, and in the second state of the

switch, the plate is disconnected from the electrical ground; and




e. an electric field meter connected to the electrical ground and spaced from the plate for measuring the electric field strength between the plate and the electrical ground when the switch is in its second state.

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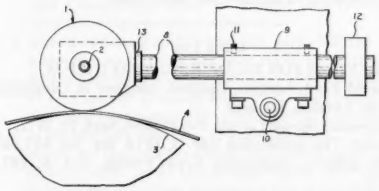
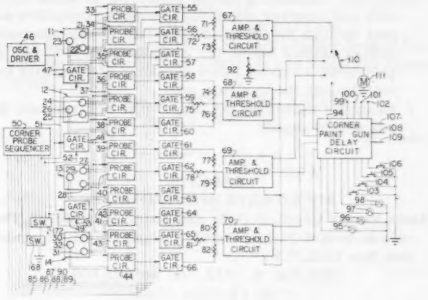
**3,866,115**
**THICKNESS GAUGE SYSTEM**
**David W. Lewis, Rt. 2, Box 198, Charlottesville, Va. 22901**
**Filed Aug. 28, 1973, Ser. No. 392,199**
**Int. Cl. G01r** *33/00*
**U.S. Cl. 324—34 TK** **6 Claims**



1. A device for the continuous monitoring of thickness of a continuously moving sheet of non-conductive material using a proximity measuring system including a proximotor and a probe, a continuously moving metallic support for said sheet material, a probe mounted directly above to said moving sheet material and supported by said material so as to be held at a constant distance from the surface of said sheet material, positioning means for said electronic probe consisting of positioning elements directly supported on the continuous moving sheet of material and mounted to move in harmony with any variation in the thickness of said sheet, said electronic probe being supported non-inductively in a mechanical housing supported by said positioning elements, said housing being freely rotatably supported on the end of a rod element, said rod element being rotatably supported on a horizontal axis parallel to the plane of movement of said sheet of material, said axis being stationarily mounted relative to said moving metallic support for said sheet of non-conductive material, said rod element being adjustably mounted relative to said horizontal axis and carrying an adjustable counterweight sufficient to reduce any pressure exerted on said continuously moving sheet by said positioning means for said probe to approximately zero, said electronic probe being so constructed and arranged as to produce an electronic signal upon any lineral movement of said electronic probe normal to said metallic support for said sheet material.

**3,866,116**
**EDDY CURRENT TESTING SYSTEM HAVING PROBE SWITCHING AND GATING MEANS**
**Eric J. Strauts, Harwood Heights; John J. Flaherty, Elk Grove, and Donald E. Lorenzi, Des Plaines, all of Ill., assignors to Magnaflux Corporation, Chicago, Ill.**
**Filed Apr. 23, 1973, Ser. No. 353,332**
**Int. Cl. G01r** *33/12*
**U.S. Cl. 324—40** **9 Claims**




1. In a non-destructive testing system, a plurality of eddy current probe means supported in closely spaced relation for disposition against closely spaced portions of a part, each of said probe means being operative when supplied with an energizing signal to develop an output signal corresponding to characteristics of the portions of the part adjacent thereto, a source of a high frequency energizing voltage, first coupling means coupling said energizing voltage source to said plurality of probe means, an output circuit, second coupling means coupling said plurality of probe means to said output circuit, said first coupling means comprising a first plurality of gate means corresponding to said plurality of probe means for controlling application of said energizing voltage thereto, said second coupling means comprising a second plurality of gate means corresponding to said plurality of probe means for supplying output signals from said probe means to said output circuit, and sequencing means for operating said first and second pluralities of gate means sequentially and in synchronism with each of said second plurality of gate means being operated at a time starting substantially after the start of the operation of the corresponding one of said first plurality of gate means and ending at a time not later than the end of the operation of the corresponding one of said first plurality of gate means.

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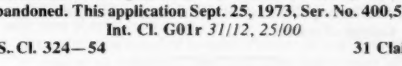
**3,866,117**
**METHOD AND MEANS FOR MEASURING THE PHASE ANGLE BETWEEN CURRENT AND VOLTAGE**
**David M. Erdman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.**
**Continuation-in-part of Ser. No. 331,539, Feb. 12, 1973, abandoned. This application Sept. 25, 1973, Ser. No. 400,579**
**Int. Cl. G01r** *31/12, 25/00*
**U.S. Cl. 324—54** **31 Claims**




1. Apparatus for measuring the phase angle between voltage and capacitive current across a grounded surface and an ungrounded surface of an insulator, comprising:

a. means for coupling the insulator to a source of alternating current to apply alternating voltage across the insulator grounded and ungrounded surfaces;

b. means for preventing parasitic capacitance and resistance of said coupling means;
c. solid state voltage transducing means connectable across the insulator grounded and ungrounded surfaces for sensing the voltage applied across the insulator to ground and for generating a first signal indicative of voltage across the insulator;
d. means for nulling parasitic capacitive and resistive current within said solid state voltage transducing means;
e. current transducing means connected in series circuit with said coupling means for sensing the capacitive current through the insulator generated by the alternating voltage applied across the insulator to ground and for generating a second signal indicative of capacitive current through the insulator; and
f. means for measuring the phase angle between said first and second signals.

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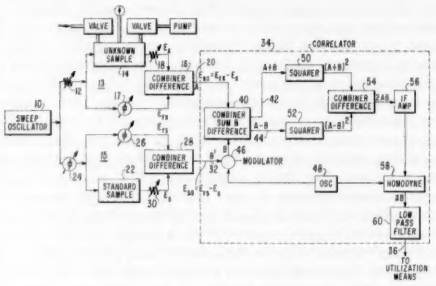
**3,866,118**
**MICROWAVE SPECTROMETER**

**Asoke Kumar Ghosh, D.D.O., and Harry John Moody, Pierrefords, both of Quebec, Canada, assignors to RCA Corporation, New York, N.Y.**

**Filed Nov. 8, 1973, Ser. No. 413,809**
**Int. Cl. G01r *27/04***
**U.S. Cl. 324—58.5 A** **12 Claims**




5. In combination:
means for deriving a first signal comprising solely a spectrum of frequencies of microwave energy which spectrum is formed by absorption of certain said energy by a sample of matter, said sample including a plurality of components including an unknown amount of a given component,
means for deriving a second signal comprising solely a spectrum of frequencies of microwave energy which spectrum is formed by absorption of certain of said energy by a known amount of said given component, and
correlating means responsive to said first and second signals applied thereto for cross-correlating said first and second signals to produce as an output signal therefrom a signal manifesting the amount of said given component in said sample of matter.

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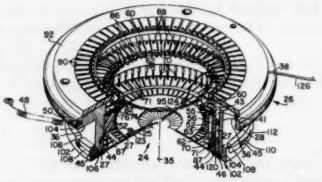
**3,866,119**
**PROBE HEAD-PROBING MACHINE COUPLING ADAPTOR**

**Frank J. Ardezzone, Santa Clara, and Thomas A. Englert, San Jose, both of Calif., assignors to Probe Rite, Inc., Santa Clara, Calif.**

**Filed Sept. 10, 1973, Ser. No. 395,429**
**Int. Cl. G01r *31/02, 1/06***
**U.S. Cl. 324—158 F** **13 Claims**

1. Probe head adaptor assembly for coupling a probing machine to a head test card for testing electronic devices, the adaptor comprising
an adaptor ring member with means for mounting on a probing machine and forming a first cylindrical wall;
a pin aligning ring member positioned coaxially within the interior of the first cylindrical wall, a plurality of conductive resilient pin members supported by the aligning ring with the tip contacts of the pin members projecting from one terminal end of the aligning ring, said tip contacts establishing a predetermined pattern to correspond with the terminal pad pattern of a probe head test card to be interconnected, each of said pin members being deflectable along a plane parallel with the axis of the aligning ring;



a clamping ring member forming an internal seat for receiving a probe head test card and supporting the card in a plane normal to the axis of the pin aligning ring, the clamping ring being interlockable with the adaptor ring with the probe head test card sandwiched intermediate the adaptor ring and the clamping ring with each of the terminal pads of the card abutting at least one of said pin members to form a common electrical path between said pads and said abutting pin members; and
transition means engaged about the other terminal end of the pin aligning ring for electrically interconnecting the pin members to exterior test equipment.

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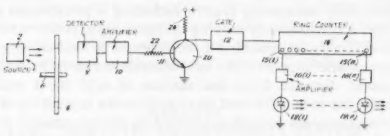
**3,866,120**
**DEVICES FOR MEASURING SHAFT R.P.M.**

**Eric Harold Ford, London, England, assignor to Lumenition Limited, London, England**

**Continuation-in-part of Ser. No. 293,586, Sept. 29, 1972, abandoned. This application Apr. 3, 1974, Ser. No. 457,660**
**Claims priority, application Great Britain, Oct. 6, 1971, 46479/71**
**Int. Cl. G01p *3/48***
**U.S. Cl. 324—175** **11 Claims**




1. A device for measuring shaft R.P.M. including: means for generating a voltage of square waveform, having two voltage states and a constant mark space ratio, in synchronism with the shaft revolutions; gate means which cyclically opens to allow passage of the pulses for a predetermined time period irrespective of the speed of rotation of the shaft; a ring counter for counting the pulses passing through the gate in said predetermined time and providing a plurality of outputs; a plurality of visible diodes arranged in equi-spaced relation from one to the next; and means for connecting said diodes to respective outputs from the ring counter so that the diodes are switched on in sequence from said outputs in accordance with the pulses counted during the time which said gate is open and are switched off again as soon as the next diode in the sequence has been lit so as to cause a line of diodes to appear continu-

ously lit during the cyclic operation, whereby the length of the line of lit diodes is proportional to the shaft R.P.M.

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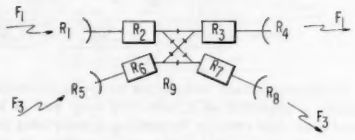
**3,866,121**
**RADIO-FREQUENCY RELAY SYSTEM**

**Shinichi Nakamura; Kazuo Morita, and Masami Takada, all of Tokyo, Japan, assignors to Nippon Telegraph & Telephone Public Corporation and Nippon Electric Company, Limited, both of Tokyo, Japan**

**Filed Nov. 21, 1972, Ser. No. 308,621**
**Claims priority, application Japan, Nov. 24, 1971, 46-94716**
**Int. Cl. H04b 1/60**
**U.S. Cl. 325—2** **2 Claims**




1. A radio frequency relay system for use in the frequency range above 10 GHz, comprising:

a first radio signal transmission path comprising a first plurality of consecutively positioned relay stations, each of said first plurality of relay stations comprising receiving means adapted to receive a radio frequency signal in said first radio signal transmission path, transmitter means for transmitting a radio frequency signal along said first radio signal transmission path, and means connecting said receiving means and said transmitting means for causing said transmitting means to transmit said received radio frequency signal,

a second radio signal transmission path, located over one kilometer away from said first radio signal transmission path, comprising a second plurality of relay stations, each of said second plurality of relay stations comprising receiving means adapted to receive a radio frequency signal in said second radio signal transmission path, transmitter means for transmitting a radio frequency signal along said second radio signal transmission path, and means connecting said receiving means and said transmitting means for causing said transmitting means to transmit said received radio frequency signal, and

a spare radio frequency transmission path formed at an angle with respect to and intersecting said first and second radio frequency transmission paths, said spare transmission path comprising at least two of said first plurality of relay stations (first and third relay stations) and one of said second plurality of relay stations (second relay station), wherein,

said first relay station comprises auxiliary transmitter means adapted to transmit a radio frequency signal along said spare path towards said second relay station, and switch means for selectively connecting said relay station receiver means to said auxiliary transmitter means to cause the signal received along said first path by said receiver means to be transmitted along said spare path by said auxiliary transmitter means,

said second relay station comprises auxiliary receiver means adapted to receive a radio frequency signal emanating from the auxiliary transmitter of said first relay station, auxiliary transmitter means adapted to transmit a radio frequency signal along said spare path towards said third relay station, and switch means for selectively connecting together said auxiliary receiving and transmitting means of said second relay station for causing a radio signal received by said auxiliary receiving means to be transmitted by said auxiliary transmitting means, and

said third relay station comprising auxiliary receiving means adapted to receive a radio frequency signal emanating from the auxiliary transmitter of said second relay station, and switch means for selectively connecting said auxiliary receiving means to said relay station transmitting means to cause the signal received along said spare path by said auxiliary receiver means to be transmitted along said first path by said transmitter means.

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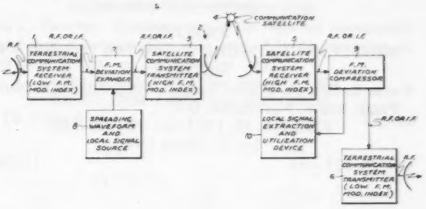
**3,866,122**
**FM COMMUNICATION SYSTEM**

**Joseph Baer, Clifton, and David M. Sacks, Nutley, both of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.**

**Filed Jan. 2, 1973, Ser. No. 320,414**
**Int. Cl. H04b 7/14**
**U.S. Cl. 325—45** **20 Claims**


COMMUNICATION SATELLITE
R.F. OR I.F.
TERRESTRIAL COMMUNICATION SYSTEM RECEIVER (LOW F.M. MOD. INDEX)
F.M. DEVIATION EXPANDER
SATELLITE COMMUNICATION SYSTEM TRANSMITTER (HIGH F.M. MOD. INDEX)
SATELLITE COMMUNICATION SYSTEM RECEIVER (HIGH F.M. MOD. INDEX)
F.M. DEVIATION COMPRESSOR
SPREADING WAVEFORM AND LOCAL SIGNAL SOURCE
LOCAL SIGNAL EXTRACTION AND UTILIZATION DEVICE
TERRESTRIAL COMMUNICATION SYSTEM TRANSMITTER (LOW F.M. MOD. INDEX)

1. A frequency modulation (FM) communication system comprising:

a first FM carrier system having a first carrier frequency modulated by a first FM deviation determined by a first given FM index;

a second FM carrier system having a second carrier frequency modulated by a second FM deviation determined by a second given FM index greater than said first index; a third FM carrier system having a third carrier frequency modulated by a third FM deviation determined by a third given FM index less than said second index;

first means coupled between a receiver of said first carrier system and a transmitter of said second carrier system operating in a first given frequency range greater than a baseband frequency range of any of said first, second and third carrier systems to expand said first deviation to equal said second deviation;

second means coupled between a receiver of said second carrier system and a transmitter of said third carrier system operating in a second given frequency range greater than a baseband frequency range of any of said first, second and third carrier systems to compress said second deviation to equal said third deviation;

said first given frequency range is selected from a radio frequency carrier range or an intermediate frequency carrier range;

said second given frequency range is selected from a radio frequency carrier range or an intermediate frequency carrier range;

said first means including

a third means coupled to said receiver of said first carrier system to frequency multiply said first carrier of said receiver of said first carrier system disposed in a selected one of said carrier ranges and said first deviation by a predetermined multiplication factor to cause said first deviation to equal said second deviation,

a first voltage controlled oscillator having a predetermined output frequency related to the frequency of said first carrier multiplied by said predetermined factor and the frequency of said second carrier of said transmitter of said second carrier system disposed in a selected one of said carrier ranges,

a first balanced mixer coupled to said third means, said first voltage controlled oscillator and said transmitter

of said second carrier system to provide said second carrier frequency modulated according to said second deviation, and

a first phase locked loop coupled between the output and input of said first voltage controlled oscillator to frequency stabilize said predetermined output frequency; said first phase locked loop including

a reference oscillator having a stable frequency equal to said predetermined output frequency,

a phase comparator coupled to the output of said voltage controlled oscillator and the output of said reference oscillator, and

a low pass filter coupled between the output of said phase comparator and said voltage controlled oscillator; and local signals coupled to said first voltage controlled oscillator to frequency modulate said predetermined output frequency by said local signals.

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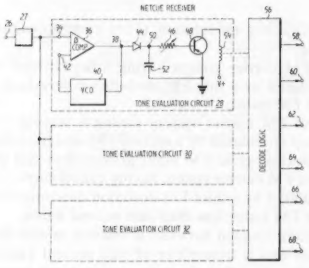
**3,866,123**

## BROADCAST NETWORK SIGNALING SYSTEM AND METHOD

**Wayne L. Hetrich, District Heights, Md., assignor to National Public Radio, Washington, D.C.**

**Filed Feb. 28, 1973, Ser. No. 336,756**
**Int. Cl. H04b 1/16**
**U.S. Cl. 325—53** **11 Claims**




7. A system for alerting the interconnected individual member stations of a radio network to network operational changes comprising:

means for superimposing for a predetermined time interval at least one of a plurality of nonmusical tones each having a predetermined amplitude and frequency on the transmitted signal without interrupting the transmission of the program signal;

means for receiving the transmitted signal including superimposed tones at one of the member stations;

means for evaluating the amplitude of any received tones against a predetermined standard of amplitude;

means for generating an output signal having a frequency controllable within predetermined limits about a predetermined frequency;

a capacitor;

means for evaluating the frequency relationship between the output signal and the received tones and for charging the capacitor in response to other than a desired frequency relationship therebetween;

means for discharging the capacitor at a predetermined rate, the capacitor discharging to a predetermined level in response to the evaluation of the desired frequency relationship between the output signal and the received tones for a predetermined period of time; and,

means responsive to said amplitude evaluating means and the discharge of said capacitor to said predetermined level for providing one of a predetermined plurality of control signals.

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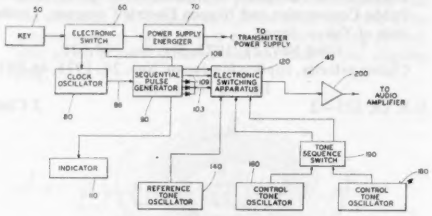
**3,866,124**

## COMMUNICATION SYSTEM INCORPORATING SIGNAL DELAY

**Keith H. Wycoff, 1205 N. Tyler St., Lexington, Nebr. 68850**

**Filed June 21, 1973, Ser. No. 372,250**
**Int. Cl. H04b 5/04**
**U.S. Cl. 325—55** **33 Claims**




1. A communication receiver for receiving incoming signals including a sequence of a reference tone and at least one control tone, said receiver comprising a processing circuit for receiving the incoming signals and providing an undelayed sequence of tones, delay means coupled to said processing circuit for providing a delayed sequence of tones, the delay being such as to cause the reference tone in one sequence to be in time coincidence with at least a portion of the one control tone in the other sequence, mixing means having two inputs respectively coupled to said processing circuit and to said delay means for mixing the undelayed sequence and the delayed sequence, whereby said mixing means provides at least one low-frequency mixed signal having a frequency representative of the difference between the frequencies of the reference tone and the one control tone, and utilization means coupled to said mixing means for using the mixed signal.

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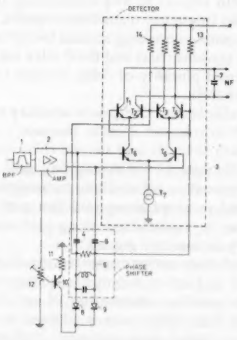
**3,866,125**

## CIRCUIT ARRANGEMENT FOR A RECEIVER FOR FREQUENCY-MODULATED SIGNALS HAVING VARIABLE ATTENUATION PHASE SHIFTER

**Ernst-August Kilian, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Aug. 15, 1973, Ser. No. 388,342**
**Claims priority, application Germany, Aug. 23, 1972, 2241344**
**Int. Cl. H04b 1/16**
**U.S. Cl. 325—348** **6 Claims**




6. A circuit comprising input means for receiving a frequency modulated signal, a phase shifting network means coupled to said input means having a frequency dependent

phase shift, and means coupled to said input means and said network for increasing the attenuation of said network with decreases in the amplitude of said received signal.

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**3,866,126**

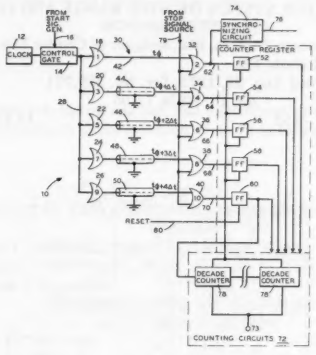
## SIGNAL MEASURING AND COUNTING APPARATUS AND METHODS

**Leonard A. Cebula, Philadelphia; Joseph F. Fitzpatrick, Jr., Warminster, and Justin A. Kershaw, Jr., Churchville, all of Pa., assignors to Technitrol, Inc., Philadelphia, Pa.**

**Filed Feb. 20, 1973, Ser. No. 334,054**

**Int. Cl. H03k** *5/159*

**U.S. Cl. 328—15** **11 Claims**




1. Counting apparatus for counting time increments in an interval of time comprising oscillator means for producing a first signal having a preselected period, counting means having a plurality of input terminals for counting an increment of time in response to a second signal appearing at an input terminal, a plurality of time delay means coupled to said oscillator means, each said delay means progressively delaying said first signal along each of said time delay means, combining means for combining the outputs of each of said delay means for forming said second signal, said combining means connected between each one of said plurality of input terminals and said time delay means for applying said second signal to said plurality of input terminals in a predetermined sequence.

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**3,866,127**

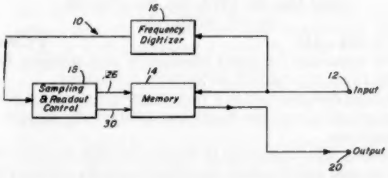
## SELECTIVE AUDIO SIGNAL FREQUENCY MULTIPLIER

**Gary A. Demos, 1153 Descanso Dr., La Canada, Calif. 91011, and David S. Ruhoff, P.O. Box 4492, Pasadena, Calif. 91106**

**Filed Sept. 12, 1973, Ser. No. 396,373**

**Int. Cl. H03k** *5/00*

**U.S. Cl. 328—38** **16 Claims**




1. Apparatus for multiplying the frequency of a continuous analog input signal while reproducing the wave form shape thereof without distortion, comprising memory means for storing wave form amplitude of the input signal during each signal period, signal sampling control means connected to the memory means and responsive to the input signal for rendering the memory means operative to sequentially sample and store a predetermined number of segments of the wave form amplitude during each of the signal periods, readout control means for sequentially transferring said predetermined number of wave form amplitude segments from the memory means, during a readout period of a duration that is a programmed function of the signal period, frequency control means connected to the readout control means for selecting an output frequency that is a multiple of said input frequency and output means connected to the memory means for transmitting an envelope of said transferred wave form segments at said output frequency.

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**3,866,128**

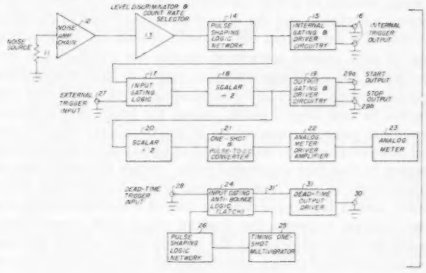
## RANDOM PULSE GENERATOR

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Reed S. Lindsey, Jr., Houston, Tex.**

**Filed June 25, 1973, Ser. No. 373,588**

**Int. Cl. H03k** *1/00, 3/04;* **H03b** *29/00*

**U.S. Cl. 328—59** **7 Claims**




1. A programmable pulse generator capable of producing random length and random separation rectangular shaped voltage pulses, comprising:

means for producing two essentially constant amplitude, randomly occurring amplitude excursion analog voltage wave forms having a relatively wide frequency bandwidth;

means connected to said analog voltage producing means, for forming the voltage difference of said two analog voltage wave forms to provide a single, relatively wide bandwidth differential analog voltage wave form having random amplitude and random occurrence voltage components;

means connected to said voltage difference forming means for selecting only those voltage components exceeding a selected amplitude in said single differential analog voltage wave form and for producing relatively short duration, constant amplitude logic voltage pulses corresponding in time occurrence to those components exceeding said selected amplitude;

means connected to said voltage selecting means for producing rectangular shaped voltage pulses of controllable duration and controllable time separation; and

means connected to said voltage selecting means for producing rectangular shaped voltage pulses of controllable duration and controllable time separation; and

means connected to said means for producing rectangular shaped voltage pulses and responsive to said constant amplitude logic voltage pulses, for controlling the duration and time separation of said means for producing rectangular shaped voltage pulses.

## 3,866,129
## DEVICE FOR THE DIGITAL SUBTRACTION OF FREQUENCIES

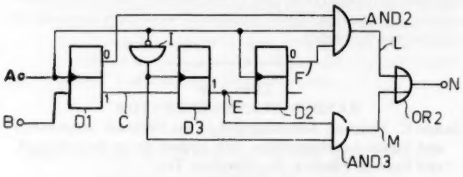
**Bernardus Henricus Jozef Cornelissen, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed May 29, 1973, Ser. No. 364,891**

**Claims priority, application Netherlands, June 3, 1972, 7207569**

**Int. Cl. H03b** *3/04;* **H03d** *13/00*

**U.S. Cl. 328—133** **3 Claims**




1. A device for the digital subtraction of first periodic waveforms of a higher frequency and second periodic waveforms of a lower frequency, comprising means for deriving a first trigger pulse extending between the instant of coincidence of a steep portion of a first waveform with the top portion of a second waveform, and the instant of coincidence of the steep portion of a subsequent first waveform with the bottom portion of said second waveform, means for producing a first command pulse corresponding in length to said trigger pulse and delayed about the half-period of said first waveforms with respect to said trigger pulse, means for producing a second command pulse corresponding in length to said trigger pulse and delayed about the half-period of said first waveforms with respect to said first command pulse, means for producing an output train of waveforms corresponding to said first waveforms, means for suppressing an output waveform during the time interval between the leading edges and, respectively, during the interval between the trailing edges of said first and second command pulses, and means for inverting the phase of said ouput waveforms during the time interval of said second command pulse.

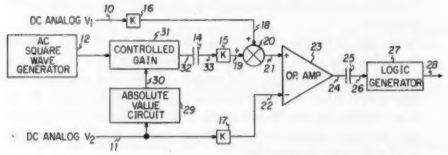
## 3,866,130
## SIGNAL COMPARATOR WITH PROGRAMMED THRESHOLD

**Melvin G. Krause, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, Dallas, Tex.**

**Filed Mar. 7, 1974, Ser. No. 449,166**

**Int. Cl. H03b** *3/02;* **H03k** *5/20*

**U.S. Cl. 328—147** **7 Claims**




1. A signal comparator having a trip threshold programmed as a direct function of the amplitude of first and second DC analog input signals being compared, comprising a saturable differential amplifier having first and second inputs, means applying signals representing like proportions of said first and second analog input signals as respective inputs to said differential amplifier inputs; bias signal development means producing an AC square wave bias signal and comprising means controlling the amplitude of said square wave bias signal in direct proportion to the level of at least one of said analog input signals; means applying said square wave bias signal to one of said differential amplifier inputs, logic level generation means, means for capacitively coupling the output of said differential amplifier to said logic level generation means, said logic level generation means being responsive to a square wave output from said differential amplifier to derive a first voltage logic level and being responsive to a steady state saturation level output from said differential amplifier to develop a second logic level, said first and second logic levels being developed in response to the difference between the levels of said first and second analog input signals respectively exceeding and being less than the peak value of said AC square wave bias signal.

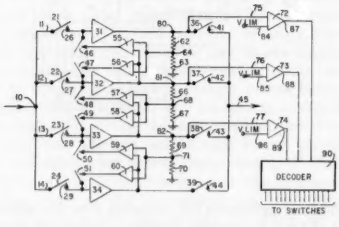
## 3,866,131
## INTEGERATOR SYSTEM OF WIDE RANGE AND PUMP CIRCUIT THEREFOR

**David R. Figueroa, Hialeah, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.**

**Filed Aug. 20, 1973, Ser. No. 389,711**

**Int. Cl. H03k** *13/06*

**U.S. Cl. 328—152** **14 Claims**




1. Apparatus for integrating electrical quantities of a wide range of magnitudes, comprising:

A. means for receiving said quantities as electric pulses,

B. a plurality of integrating stages connected to said receiving means for selectively receiving and accumulating said pulses,

C. voltage dividing means coupled to said integrating stages for establishing varying contiguous ranges for said integrating stages,

D. comparing means connected to the outputs of said integrating stages for sensing critical values of said accumulated electric quantities, and

E. control means coupled to said comparing means for activating and deactivating integrating stages in response to said critical values of electric quantities.

## 3,866,132
## MOVING FOIL STRIPPER FOR A PARTICLE ACCELERATOR

**Andrew J. Gorka, Jr., Naperville, Ill., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed May 30, 1974, Ser. No. 474,556**

**Int. Cl. H05h** *7/00*

**U.S. Cl. 328—233** **9 Claims**

1. An apparatus for timed insertion of thin stripping foils into the beam of a particle accelerator comprising:

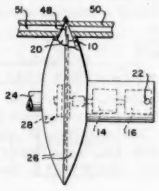
a circular disk disposed in a vacuum environment in a plane perpendicular to the beam and substantially tangent to the beam;

a rotating drive connected to the circular disk to rotate said disk, said rotating drive including means for adjusting the phase of rotation of said circular disk relative to the beam;

a stripping foil connected to the circular disk at a first edge of said foil near the circumference of the disk and at a

second edge of said foil radially inward from said first edge; and

means for releasing said foil near said second edge while rotating said disk,



whereby release of said foil and adjustment of said phase of rotation effects timed insertion of said foil into said beam.

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**3,866,133**

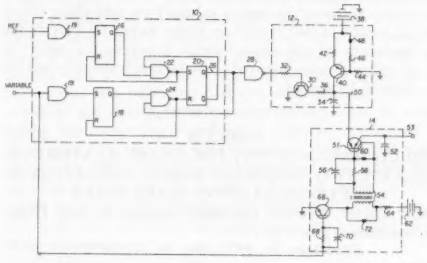
**DIGITAL FREQUENCY-PHASE DISCRIMINATOR CIRCUIT**

**Roger C. Debloois, West Lake Village, Calif., and Noel E. Hogue, Cedar Rapids, Iowa, assignors to Rockwell International Corporation**

**Filed Mar. 7, 1974, Ser. No. 448,854**

**Int. Cl. H03k** *9/00, 5/20*

**U.S. Cl. 329—104** **2 Claims**



1. A digital frequency-phase discriminator circuit for comparing a variable periodic signal with a reference periodic signal, comprising:

discriminator means for providing one digital control signal when the frequency of the variable signal is less than that of the reference signal, another digital control signal when the variable signal frequency is greater than the reference signal frequency and alternations between the two control signals when the periodic signals have the same frequency but different phase angles with the duty cycle in such case being a linear function of the phase angle between the periodic signals;

ramp generator means having an output between two fixed levels wherein the output is maintained at one level in response to one of the control signals and is enabled to linearly change to the other level in response to the other control signal, the other level being attained in a time period corresponding to the period of the reference signal; and

sample and hold circuit means for periodically sampling the output of said ramp signal generator means and holding the sampled value until the next sample is taken.

**3,866,134**

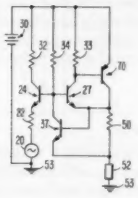
**POWER AMPLIFIER WITH SELF BIASING AND INSENSITIVITY TO TEMPERATURE VARIATIONS**

**Hobart Atsushi Higuchi, and Richard Arnold Voge, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 9, 1973, Ser. No. 387,097**

**Int. Cl. H03f** *3/04;* **H03f** *3/68*

**U.S. Cl. 330—22** **12 Claims**



1. An electric signal amplifying circuit arrangement operable independently of variation in ambient temperature, comprising:

signal input terminals,

signal output terminals,

an output transistor having base, emitter and collector electrodes,

an input transistor and a compensating transistor having base-emitter potential characteristics matched over a range of temperature through which the amplifying circuit arrangement is operable,

said input and compensating transistors each having base emitter and collector electrodes,

a bias resistor connected between one of said signal input terminals and said emitter electrode of said input transistor,

load resistors individually connected between said collector electrode of said input and said compensating transistors and a source of energizing potential,

an electric current carrying element connected between said base electrode of said output transistor and one of said load resistors at the terminal remote from said source of energizing potential,

the emitter and collector electrodes of said output transistor and a biasing resistor being connected in series between one of said signal output terminals and one terminal of said source of energizing potential

an electric current carrying element connected between said biasing resistor at the terminal thereof remote from emitter electrode of said compensating transistor,

a bias circuit resistor having one terminal connected in common to said base electrodes of said input and compensating transistors and the other terminal connected to said source of energizing potential,

whereby the effect of temperature change on the current applied to a load element connected to said output terminals is compensated.

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**3,866,135**

**REVERSING CONTROLLER**

**Ralph E. Clements, Loves Park, Ill., assignor to Barber-Colman Company, Rockford, Ill.**

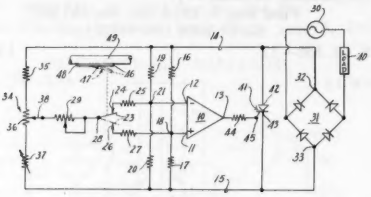
**Continuation of Ser. No. 249,910, May 3, 1972, abandoned. This application Sept. 12, 1973, Ser. No. 396,511**

**Int. Cl. H03f** *1/14*

**U.S. Cl. 330—51** **10 Claims**

1. A control circuit comprising an amplifier having first and second input terminals and an output terminal, a pair of conductors for connection to a power source, a first series resistance circuit connected between said conductors and having a first tap coupled to the first input terminal, a second series

resistance circuit connected between said conductors and having a second tap coupled to the second input terminal, a voltage divider connected between said conductors and having a third tap, a variable condition sensor in the voltage



divider to provide a condition variable voltage signal at said third tap, and means for selectively coupling said third tap to a selected one of the input terminals, whereby an output signal produced at the output terminal may be reversed with respect to said condition variable voltage signal.

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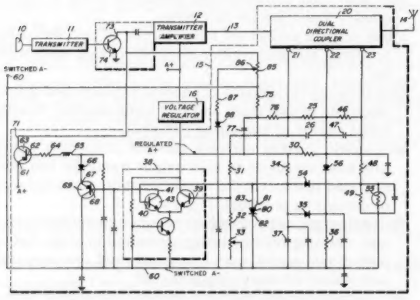
**3,866,136**

## AMPLIFIER PROTECTION CIRCUIT

**Michael J. Augustin, Hoffman Estates; Wayne C. Kramer, Villa Park, and Robert M. Treanor, Lake Zurich, all of Ill., assignors to Motorola, Inc., Franklin Park, Ill.**

**Filed Apr. 23, 1973, Ser. No. 353,287**
**Int. Cl. H03f *21/00***
**U.S. Cl. 330—207 P** **6 Claims**



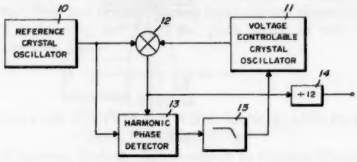

**1.** A protection circuit for controlling the power of a transmitter amplifier which produces an output varying with a control signal applied thereto, said circuit including in combination: first circuit means coupled to the transmitter amplifier output for sensing the forward power coupled therefrom, said first circuit means developing a first signal which varies in accordance with the sensed forward power; bias circuit means for developing a second signal; signal comparing means coupled to said first circuit means and said bias circuit means for comparing said first and second signals, said signal comparing means developing a control signal which varies in accordance with the difference between said first and second signals, said signal comparing means being coupled to the transmitter amplifier for applying said control signals thereto to vary the power developed by the transmitter amplifier; and delayed power level sensing circuit means coupled to said first circuit means and said bias circuit means, said delayed circuit means being operative in response to said forward power being below a predetermined level for a predetermined period of time to reduce said second signal, said comparison means being operative in response to said reduced second signal to reduce said control signal for decreasing said transmitter amplifier power.

**3,866,137**

## PHASE LOCKED FREQUENCY DIVIDER CIRCUITRY

**Francis R. Steel, Pompano Beach, Fla., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Sept. 14, 1973, Ser. No. 397,482**
**Int. Cl. H03b *3/08***
**U.S. Cl. 331—18** **7 Claims**




**1.** Phase locked frequency divider circuitry for providing a signal having a desired frequency comprising:

a. crystal controlled reference means providing a first signal having a first frequency which is a harmonic of the desired frequency;

b. voltage variable crystal oscillator means providing a second signal having a second frequency different from the first frequency by the desired frequency;

c. mixer means connected to receive the first signal from said reference means and the second signal from said oscillator means and provide an output signal having substantially the desired frequency at an output thereof;

d. harmonic phase detector means connected to receive the first signal from said reference means and the output signal from the output of said mixer means, said phase detector means providing an output voltage indicative of a synchronous relationship between the first frequency and the desired frequency; and

e. means coupling the output voltage from said phase detector means to said crystal oscillator means for varying the frequency of said second signal to maintain a relatively constant synchronism between the first frequency and the desired frequency.

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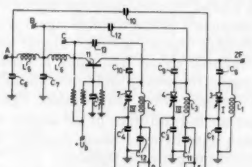
**3,866,138**

## CIRCUIT ARRANGEMENT FOR AN OSCILLATOR FOR AT LEAST TWO FREQUENCY RANGES AND ITS USE AS A SELF-OSCILLATING MIXER STAGE

**Walter Putzer, Krefeld, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 15, 1973, Ser. No. 416,075**
**Claims priority, application Germany, Nov. 24, 1972, 2257574**
**Int. Cl. H03b *5/12*; H03j *5/24***
**U.S. Cl. 331—60** **11 Claims**



**8.** An oscillator circuit for at least two frequency ranges said circuit comprising an amplifying element having input and output electrodes, a plurality of frequency-determining tuning circuits for said ranges respectively, each of said tuning circuits having an associated variable reactance tuning element

coupled to said output electrode, all of the tuning elements being commonly controlled, a resonant circuit coupled to said input electrode, a plurality of feedback paths for said ranges respectively coupled from the respective tuning circuit to said resonant circuit, means for ensuring that oscillation conditions are satisfied in only a part of the tuning range of each tuning circuit comprising the resonant circuit and said feedback paths having selected values, and means for applying to at least one variable reactance element a fixed bias.

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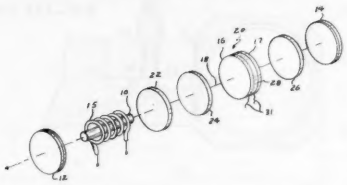
**3,866,139**

**APPARATUS FOR LASER FREQUENCY SELECTION**

**George D. Currie, Ann Arbor, Mich., assignor to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Oct. 11, 1973, Ser. No. 405,620**
**Int. Cl. H01s *3/00*; G02f *1/26***
**U.S. Cl. 331—94.5 C** **3 Claims**



**1.** A laser system comprising: first and second reflecting surfaces spaced from each other along an axis and defining a resonant cavity; a lasing medium within said cavity; means for pumping said lasing medium; said lasing medium having gain over a plurality of frequency regions within said cavity; means for linearly polarizing the light output of said lasing medium; a first quarter wave plate within said cavity, between said lasing medium and one of said reflecting surfaces, adapted to convert said linearly polarized light to circularly polarized light; a second quarter wave plate, spaced from said first quarter wave plate, between said first quarter wave plate and said one of said reflecting surfaces, adapted to convert said circularly polarized light to linearly polarized light; an etalon, having third and fourth reflecting surfaces, positioned between said first and said second quarter wave plates within said cavity, with the reflecting surfaces of said etalon being positioned perpendicular to said axis; said etalon including means for setting its transmission characteristic to coincide with only one predetermined frequency gain region of the lasing material.

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**3,866,140**

**OPTICAL CAVITY FOR A LASER**

**James Lee Hobart, and Wayne S. Mefferd, both of Palo Alto, Calif., assignors to Coherent Radiation Laboratories, Palo Alto, Calif.**

**Division of Ser. No. 778,072, Nov. 22, 1968, Pat. No. 3,683,297. This application Apr. 24, 1972, Ser. No. 247,201**
**Int. Cl. H01s *3/02*, *3/22*; G02b *5/08***
**U.S. Cl. 331—94.5** **2 Claims**

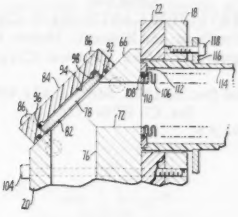
**1.** In a laser having an optical path, a support body adjacent to said optical path, a pair of end mirrors mounted on said body at opposite ends of said optical path, and a lasing medium mounted on said body and extending along said optical path, the improvement comprising:

A. at least one corner block mounted on said body for folding said optical path with said corner block comprising:

1. an integral mass of ceramic material having a pair of exterior faces inclined to each other at an angle of 90°;
2. a pair of generally parallel and spaced apart bores extending through said mass from said exterior faces and intersecting said exterior faces at generally elliptical apertures;
3. a transverse bore extending through said mass and connecting said elliptical apertures, and
4. a recess in each of said exterior faces the minimum width of which is at least as large as the maximum width of the elliptical aperture in said face,

B. a mirror mounted on each of said exterior faces of said mass whereby said mirrors can be rotated without bringing into said elliptical apertures any surface of said mirror which was previously in engagement with said mass, and

C. a mirror support means for each of said mirrors on each corner block comprising a mounting plate having on one side thereof a central area inside the periphery of said mirror and an outer area surrounding said inner area and outside the periphery of said mirror, a resilient O-ring



positioned between said mirror and said one side of said plate between said central and outer areas thereof, a through passageway in said plate extending between said central and outer areas to permit gas flow therethrough;

D. mounting means for mounting said plate on said ceramic mass with said O-ring compressed and with said mirror engaging said exterior face of said mass with said mounting means having a fluid seal between said ceramic mass and said outer area of said plate; and

E. chamber means for containing said lasing medium, with said chamber means being in gaseous communication with said mirror and with said outer area of said plate, and being in gaseous communication through said through passageway, with the side of said mirror opposite to said block.

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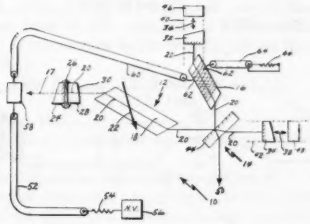
**3,866,141**

**BANDWIDTH-LIMITED, CAVITY-DUMPED, LASER SYSTEM**

**David Milam, Burlington; Audun Hordvik, Acton; Rudolph A. Bradbury, Saugus, and Howard R. Schlossberg, Lexington, all of Mass., assignors to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Dec. 21, 1973, Ser. No. 427,287**
**Int. Cl. H01s *3/10***
**U.S. Cl. 331—94.5 M** **9 Claims**



**1.** A laser system for producing bandwidth-limited, cavity-dumped pulses comprising a laser medium, a reflective surface

located adjacent one end of said laser medium and located along a common optical axis with said laser medium, a Michelson interferometer located adjacent the other end of said laser medium and in optical alignment with said reflective surface, said Michelson interferometer having a beam splitter, a first reflective surface and a second reflective surface, both said surfaces being substantially totally reflective, and a means interposed between said beam splitter and one of said substantially totally reflective surfaces for shifting the phase of that portion of a laser beam directed from said beam splitter to said one substantially totally reflective surface whereby upon a 90° phase shift of said portion of said laser beam, said bandwidth-limited pulse will be dumped from said laser system.

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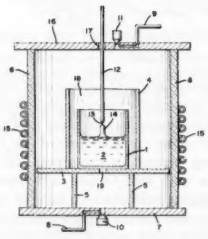
## 3,866,142
## DOPED BERYLLIUM LANTHANATE CRYSTALS

**Carl F. Cline, Mendham, and Robert C. Morris, Flanders, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.**

**Filed Dec. 6, 1973, Ser. No. 422,450**
**Int. Cl. H01s 3/16**
**U.S. Cl. 331—94.5 F** **4 Claims**



1. A laser comprising:

a. a laser host comprising at least one single crystal of doped beryllium lanthanate having the formula $Be_2La_{2-2x}Z_{2x}O_5$, wherein Z is a dopant selected from the group consisting of praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and mixtures thereof and wherein $x$ is a positive value not greater than about 0.2; and

b. means for exciting said dopant atoms contained in said crystal to cause said atoms to emit radiation.

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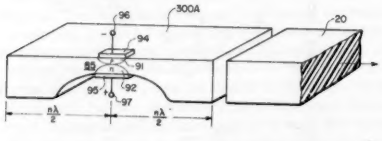
## 3,866,143
## QUASI-OPTICAL INTEGRATED CIRCUITS

**Harold Jacobs, West Long Branch, and Metro M. Chrepta, Neptune, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Continuation-in-part of Ser. No. 218,964, Jan. 19, 1972, abandoned. This application Sept. 13, 1973, Ser. No. 397,184**
**Int. Cl. H03b 7/14**
**U.S. Cl. 331—107 R** **11 Claims**



1. A quasi-optical oscillator comprising an active electron device capable of operating in the millimeter and submillimeter region of the electromagnetic frequency spectrum and a cavity resonator structure having a resonant line length and consisting of a bulk intrinsic semiconductor material of high resistivity for guiding wave energy produced by said electron device, said electron device being positioned within said resonator structure, said electron device further having applied thereto a unidirectional biasing potential.

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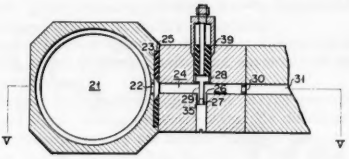
## 3,866,144
## MICROWAVE OSCILLATOR

**Yoshihiko Sawayama, 1806 Nagota-cho, Minami-ku, and Kenji Hirai, 4421-23, Akuwa-cho, Seya-ku, both of Yokohama, Japan**

**Filed Nov. 5, 1973, Ser. No. 412,836**
**Claims priority, application Japan, Nov. 9, 1972, 47-11158; Aug. 30, 1973, 48-96679**
**Int. Cl. H03b 7/14**
**U.S. Cl. 331—107 G** **20 Claims**



1. A microwave oscillator comprising a transmission line; an oscillation circuit including a solid oscillation element and connected to the transmission line at an intermediate point; a series circuit including an oscillation cut-off resistor having a smaller impedance than the characteristic impedance of said transmission line and a high-Q resonance circuit, said series circuit being connected to one end of the transmission line; and a reactive coupling means connected to the other end of the transmission line.

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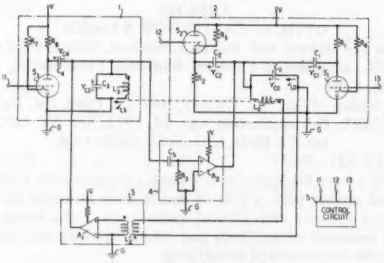
## 3,866,145
## TUNED OSCILLATOR CIRCUIT FOR PROVIDING A ROTATING IN-PLANE MAGNETIC FIELD

**William Emil Hess, Jr., Piscataway, and George Philip Vella-Coleiro, Plainfield, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 7, 1974, Ser. No. 431,504**
**Int. Cl. H03b 11/08**
**U.S. Cl. 331—128** **17 Claims**



1. An oscillator circuit comprising:

a tuned circuit,

first means for storing a first predetermined amount of energy,

second means for storing a second predetermined amount of energy,

first means for transferring said first predetermined amount of energy to said first storing means,

second means for transferring from said first storing means to said tuned circuit an amount of energy sufficient to initiate an oscillatory current of a predetermined frequency, amplitude and phase in said tuned circuit, and

third means for transferring from said tuned circuit to said second storing means an amount of energy sufficient to terminate said oscillatory current at a predetermined phase point without producing undesirable transient ringing effects.

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**3,866,146**

## PULSE WIDTH MODULATORS

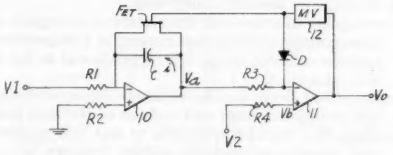
**Cornelis Van Mourik, Hoogland, Netherlands, assignor to Control Data Corporation, Minneapolis, Minn.**

**Filed Mar. 8, 1974, Ser. No. 449,404**

**Claims priority, application Netherlands, Oct. 22, 1973, 7314475**

**Int. Cl. H03k 7/08**

**U.S. Cl. 332—9 R** **10 Claims**




1. A pulse width modulator, comprising:

integrator means comprising first inverting amplifier means having a first input, a second input and a first output, one of said first and second inputs being an inverting input and the other of said first and second inputs being a non-inverting input, and storage means connected between the first input and the first output of said first amplifier means;

second inverting amplifier having a third input, a fourth input and a second output, said third input being the same type as said first input and said fourth input being of the same type as said second input;

means connecting said first output to said third input, and means providing a reference potential to said second input;

first input means for supplying a signal to said first input and second input means for supplying a signal to said fourth input; and

reset means connected to said second output for resetting said storage means.

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**3,866,147**

## BALANCED CORRELATED TERNARY CODING SYSTEM

**Gilbert De Couvreur, and Marc Pastor, both of Sherbrooke, Canada, assignors to Universite de Sherbrooke, Sherbrooke, Canada**

**Filed Feb. 26, 1973, Ser. No. 336,048**

**Int. Cl. H03k 13/24**

**U.S. Cl. 332—11 R** **6 Claims**

1. A modulator for converting a binary code into a ternary code comprising:

a. an inverter for receiving a binary code B and capable of generating at its output the complement B;

b. a first and a second flip flop of the JK type each having two inputs J and K and two complementary outputs Q and Q satisfying the following logic equations:

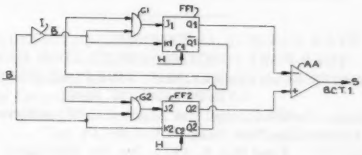
$$Q_{n+1} = Q_n J_n + Q_n K_n \quad (1)$$

$$Q_{n+1} = Q_n J_n + Q_n K_n \quad (2)$$

c. a first and a second gate each having two inputs and one output, the output of said first and second gates connected to one of the inputs J and K of the first and second flip flops respectively;

d. an arithmetic adder having a first and a second input and one output, the first and second inputs of said arithmetic adder connected to one output of said first and second flip flops respectively and the output of said arithmetic adder providing said ternary code; and

e. means interconnecting the outputs of said first and second gates to one of the inputs J and K of said first and second flip flops respectively, one of the outputs Q and Q of said first and second flip flops to the first and second inputs respectively of said arithmetic adder, one of the binary code B and its complement B to one input of said




first and second flip flops and to the first input of said first and second gates, and the second input of the first and second gates to one output of said second and first flip flops respectively so that the first and second inputs of said arithmetic adder satisfy the following logic equations respectively:

$$Y_{1n+1} = Y_{1n}\, Y_{2n}\, B_n + Y_{1n}\, B_n \quad (3)$$

$$Y_{2n+1} = Y_{1n}\, Y_{2n}\, B_n + Y_{2n}\, B_n \quad (4)$$

wherein $B_n$ = a digit of the binary code,

$Y_{1n}$, $Y_{2n}$ = the present state of the ternary code expressed in binary form,

$Y_{1n+1}$, $Y_{2n}$ = the following state of the ternary code expressed in binary form.

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**3,866,148**

## AMPLITUDE MODULATOR HAVING A TRANSISTOR CONTROLLED BIAS CURRENT

**Thomas K. Lisle, Jr., Glen Burnie, and Joseph Romanchak, Pasadena, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 23, 1973, Ser. No. 418,352**

**Int. Cl. H03c 1/38, 1/54**

**U.S. Cl. 332—31 T** **4 Claims**

1. An amplitude modulator having low modulation distortion comprising:

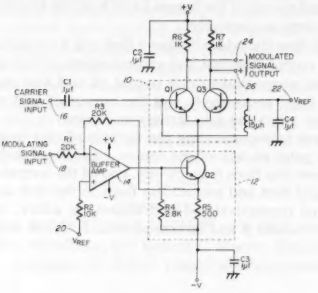
a. a common-emitter differential amplifier;

b. means for applying a carrier signal to said amplifier;

c. means for applying a reference voltage to said amplifier;

d. a transistor having its collector junction connected to the common emitter connection of said amplifier for biasing said amplifier with a voltage-controlled, linear-tuning, constant current modulation signal;

e. an operational amplifier connected to the base of said transistor, the feedback path of said operational amplifier




being coupled to the emitter of said transistor whereby the non-linearity of said transistor is eliminated.

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**3,866,149**

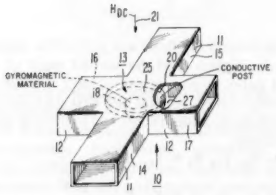
**FOUR-PORT JUNCTION CIRCULATOR HAVING LARGER DIAMETER CONDUCTIVE POST CONTACTING GYROMAGNETIC POST**

**George Christian Jung, Los Angeles, Calif., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 6, 1973, Ser. No. 422,313**

**Int. Cl. H01p** *1/32*

**U.S. Cl. 333—1.1** **3 Claims**




**1.** In a four terminal waveguide circulator operable over a given frequency range comprising a pair of rectangular waveguides extending in perpendicular relationship in a common plane to form a junction having a pair of parallel boundary walls, separated from each other by a height equal to the height of each of said waveguides, and a cylindrical post of gyromagnetic material of a first diameter disposed within said junction of said waveguides between said boundary walls and on one of said boundary walls at the center of said junction, the axis of said post of gyromagnetic material being normal to said plane and the axial length of said post of gyromagnetic material being less than the distance between said boundary walls, and means for providing a magnetic field directed axially of said post of gyromagnetic material, the improvement therewith comprising:

a cylindrical conductive post of a diameter greater than said first diameter by an amount at least approximately a half wavelength at a frequency within said give frequency range disposed between said boundary walls at said junction and on the other of said boundary walls, the axis of said conductive post being normal to said plane with said conductive post extending to contact said post of gyromagnetic material, the gyromagnetic post and the conductive post being centered on an axis which intersects the center lines of said waveguides, the relative heights and the diameters of said posts being dimensioned with a given strength of said magnetic field to provide circulator action.

**3,866,150**

**WAVEGUIDE JUNCTION CIRCULATOR HAVING CONDUCTIVE PARTITION IN MAGNETIC MIDPLANE OF FUNCTION**

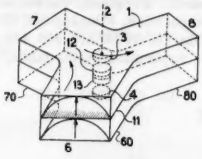
**Ngo Hai Thai, and Joseph Violi, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Nov. 26, 1973, Ser. No. 418,821**

**Claims priority, application France, Nov. 28, 1972, 72.42261**

**Int. Cl. H01p** *1/32*

**U.S. Cl. 333—1.1** **7 Claims**




**1.** A circulator assembly comprising:

a waveguide structure with three coplanar waveguide arms of rectangular cross-section merging in a magnetic-plane junction centered on an axis perpendicular to the magnetic plane;

a pair of first ferrite members spacedly mounted along said axis on opposite inner wall surfaces of said structure;

a conductive partition transverse to said axis mounted in said junction substantially midway between said wall surfaces, said partition extending all-around past said ferrite members and spanning the entire area of said junction;

a pair of second ferrite members coextensive with said first ferrite members on opposite faces of said partition, said first ferrite members spacedly confronting said second ferrite members; and

magnetic-field generating means in line with said axis mounted externally on said structure.

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**3,866,151**

**SPECIFIC FREQUENCY SIGNAL DETECTING CIRCUIT**

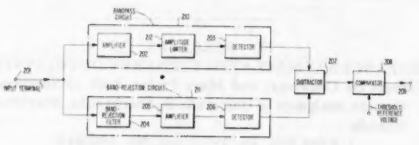
**Mutsunari Tajima, and Isao Komatsu, both of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan**

**Filed Mar. 13, 1973, Ser. No. 340,794**

**Claims priority, application Japan, Mar. 14, 1972, 47-026432**

**Int. Cl. H04b** *3/04*; **H03h** *7/14*

**U.S. Cl. 333—17** **3 Claims**




**1.** In a specific frequency signal detecting circuit comprising:

means for passing full-range frequency components in a transmission frequency band and for delivering a first d.c. signal representative of the level of said full-range frequency components;

means for attenuating specific frequency components in said frequency band, for passing the remaining frequency components in said frequency band, and delivering a second d.c. signal representative of the level of said remaining frequency components;

means for subtracting said second d.c. signal from said first d.c. signal; and

means for generating a detection signal when the output of said subtracting means exceeds a given threshhold value, thereby to detect a specific frequency signal contained in said specific frequency components;

the improvement comprising an amplitude limiting means in said full-range frequency components passing means for restricting the output level of said full-range frequency components passing means to a value below a predetermined level.

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**3,866,152**

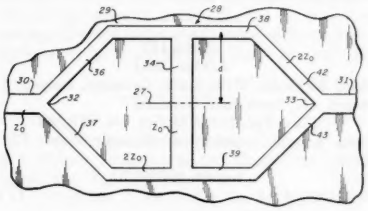
## HIGH FREQUENCY PLANAR NETWORK WITH NON-RADIATING CIRCUIT ELEMENTS

**Gerald F. Ross, Lexington, Mass., assignor to Sperry Rand Corporation, Great Neck, N.Y.**

**Filed June 28, 1973, Ser. No. 374,299**

**Int. Cl. H01p** *1/00, 5/00*

**U.S. Cl. 333—20** **5 Claims**



**1.** Planar transmission line pulse forming network means comprising:

dielectric substrate means,

symmetrically branching signal divider junction means affixed to one surface of said dielectric substrate means and having first and second port means and separate input means for receiving an electromagnetic pulse signal,

symmetrically branching signal summing junction means affixed to said surface of said dielectric substrate means and having third and fourth port means and separate output means, and

transmission line means for conductively coupling said first and second port means to said third and fourth port means for converting said received electromagnetic pulse signal into two electromagnetic pulses separated in time flowing from said signal summing junction means at said output means,

said transmission line means being disposed substantially at right angles to the direction of electromagnetic energy propagation within said input and output means symmetrically therebetween.

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**3,866,153**

## ULTRA LOW DIFFRACTION LOSS SUBSTRATE MEMBERS FOR ACOUSTIC SURFACE WAVE DEVICES

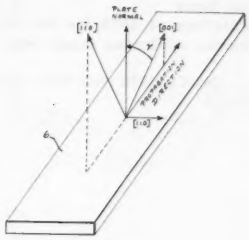
**Andrew J. Slobodnik, Jr., Burlington, Mass., and Thomas L. Szabo, Falls Church, Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 11, 1973, Ser. No. 405,710**

**Int. Cl. H01v** *7/02*; **H03h** *9/30*

**U.S. Cl. 333—30 R** **4 Claims**

**1.** An acoustic surface wave device substrate member of single crystal bismuth germanium oxide having a surface wave propagation surface defined by a plane that substantially coincides with the Euler angles Lambda = 45°, Gamma = an angle not less than 37° and not greater than 43, and Theta = 90°.



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**3,866,154**

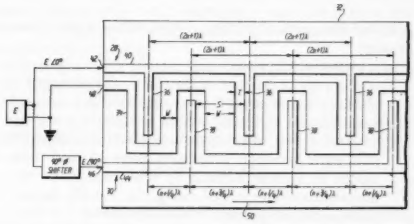
## BROADBAND UNIDIRECTIONAL SURFACE WAVE TRANSDUCER

**Robert A. Moore, Arnold, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 3, 1973, Ser. No. 421,585**

**Int. Cl. H03h** *9/02, 9/26, 9/30*

**U.S. Cl. 333—30 R** **10 Claims**



**1.** A surface wave transducer comprising:

a substrate;

a first plurality of spaced, generally parallel, interconnected, electrically conductive members carried by said substrate;

a second plurality of spaced, generally parallel, interconnected, electrically conductive members carried by said substrate;

said first plurality of members extending intermediate at least some of said second plurality of members in spaced, generally parallel and coplanar relation thereto; and,

a common terminal for each of said first and second plurality of members, said common terminal comprising a strip of electrically conductive material spaced from and meandering through the spaces between said first and second plurality of members,

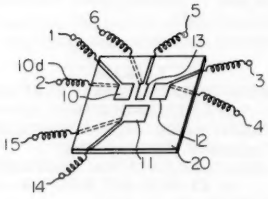
the center-to-center spacing between adjacent members of said first plurality of members and between adjacent members of said second plurality of members being substantially equal to an odd multiple of acoustic wavelength of the substrate material, and

each of said first plurality of members extending intermediate said second plurality of members at locations displaced approximately one quarter an acoustic wavelength from a location disposed centrally of adjacent of the members of said second plurality of members.

## 3,866,155
## ATTENUATION POLE TYPE MONOLITHIC CRYSTAL FILTER

Masaki Kobayashi; Izumi Kawakami, and Katuhiko Gunji, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Sept. 14, 1973, Ser. No. 397,278
Claims priority, application Japan, Sept. 20, 1972, 47-93670
Int. Cl. H03h 9/02, 9/26, 9/32
U.S. Cl. 333—72 5 Claims




1. An attenuation pole type monolithic crystal filter comprising:
   a. a piezoelectric plate;
   b. a plurality of pairs of main electrodes arranged on said plate, first and second pairs of which are connected respectively to input and output terminals; and
   c. at least a pair of intermediate electrodes positioned on said plate between successive pairs of said main electrodes in a plane defined by said main electrodes, said intermediate electrodes being electrically distinct from said successive pairs of main electrodes;
   d. wherein the drop in frequency due to said intermediate electrode is larger than the drop in frequency due to said main electrodes;
   e. all main electrodes being an energy trapping type electrode which generates a standing wave of mechanical oscillation therebeneath;
   f. and said intermediate electrode having a mass per unit area larger than said one main electrode, said intermediate electrode operating to couple energy of said standing wave with the next successive main electrode by inverting the phase of said standing wave by 180°.

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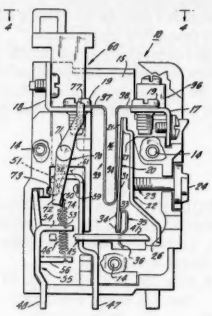
## 3,866,156
## OVERLOAD RELAY INDICATING MEANS

Bernard DiMarco, Bellefontaine, and Andrew J. Kralik, Marysville, both of Ohio

Division of Ser. No. 428,097, Dec. 26, 1973,. This application July 18, 1974, Ser. No. 489,807
Int. Cl. H01h 71/04
U.S. Cl. 337—79 3 Claims

1. A switch device including a stationary contact, a movable contact engageable with said stationary contact, first spring means biasing said movable contact toward said stationary contact when said contacts are engaged, first means for indicating contact position, said first means including a portion engageable with said movable contact and second biasing means urging said portion into engagement with said movable contact, said second biasing means being substantially weaker



than said first biasing means and acting in opposition thereto when said contacts are engaged.

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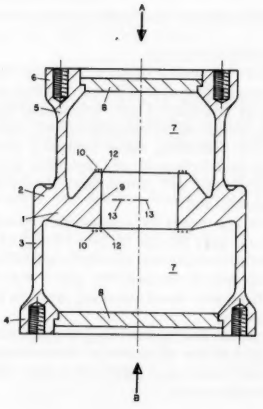
## 3,866,157
## LOAD CELL

Gottfried Birkholtz, Weiterstadt, Germany, assignor to Carl Schenck AG, Darmstadt, Germany

Filed Apr. 19, 1973, Ser. No. 352,560
Claims priority, application Germany, Sept. 12, 1972, 2244615
Int. Cl. G01l 1/22
U.S. Cl. 338—5 13 Claims




1. A load cell comprising a ring-shaped intermediate member, a pair of tubular members concentric with said intermediate member and extending from said intermediate member in opposite directions at different radii, for transmitting forces to said intermediate member, a ring-shaped deformation member circumferentially connected to said intermediate member and extending inwardly therefrom, whereby axially directed forces in said tubular members are substantially radially outside of said deformation member, and are transmitted to said deformation member by way of said intermediate member, and mechanical-electrical transducer means on said deformation member radially inwardly of said tubular members.

3,866,158

## RESISTANCE THERMOMETER

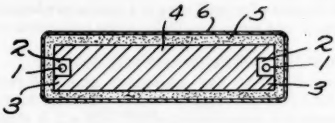
Rudi Reber, Neuenhasslau, and Robert Herzog, Grossweizheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Aug. 17, 1973, Ser. No. 389,159

Claims priority, application Germany, Aug. 18, 1972, 2240651

Int. Cl. H01c 7/04

U.S. Cl. 338—25 9 Claims




1. A resistance thermometer especially suitable for measuring temperature in electrical machinery comprising in combination a thin flexible carrier body having two opposed narrow sides and two opposed relatively wide sides and measuring wire means positioned in a first groove extending in and along the length of a narrow side of said thin flexible carrier body said wire means having a sensing portion for producing an electrical signal which varies as a function of temperature and lead portions for receiving an input signal and providing an output.

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3,866,159

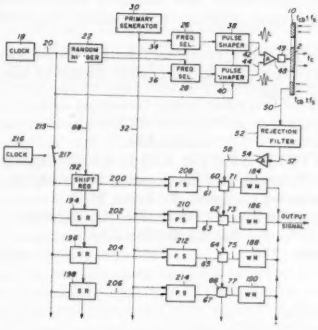
## CARRIER BEAM SENSOR

William R. Turner, Silver Spring, Md., assignor to Automation Industries, Inc., Silver Spring, Md.

Filed Apr. 2, 1973, Ser. No. 347,101

Int. Cl. G01s 9/66, 7/66

U.S. Cl. 340—3 R 21 Claims




1. An improved method of detecting and isolating incoming acoustic waves comprising:
   a. randomly generating a series of discrete frequency signals and projecting said signals into a medium;
   b. reacting said projected signals with discontinuities present in said medium to create back-scattered components of said discrete frequency signals;
   c. modulating said back-scattered components with said incoming acoustic waves to produce cross-modulation products;
   d. receiving said cross-modulation products; and
   e. comparing said received cross-modulation products with delayed replicas of said discrete frequency signals whereby said received products are converted into an output signal corresponding to said incoming acoustic waves.

3,866,160

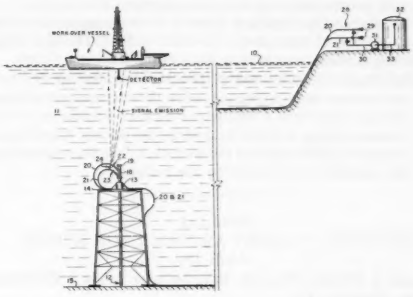
## SIGNALING THE LOCATION OF UNDERWATER WELLS

Charles A. Brasier, 4508 Wade Dr., Metairie, La. 70003

Filed May 29, 1969, Ser. No. 828,925

Int. Cl. H04b 13/02; E21b 47/12

U.S. Cl. 340—5 R 4 Claims




1. A method of locating the position of a selected underwater well among a plurality of horizontally spaced-apart wells, each having an underwater wellhead and at least two interconnected pipe strings, each of said wellheads being interconnected successively to another of said wellheads by underwater conduits forming fluid passageways providing fluid communication from one well to another, at least two of said wells having a remotely accessible conduit fluidly communicating with a remotely accessible location, said remotely accessible conduits forming with said underwater conduits a flow line circuit beginning and ending at said remote accessible place, said method comprising:
   a. inserting a signal emitter into one of said remotely accessible conduits; and
   b. propelling said signal emitter through said flow line circuit to a selected position in said flow line circuit proximate said selected underwater well.

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3,866,161

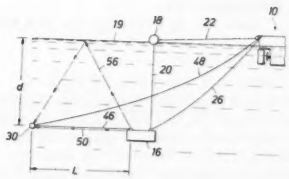
## METHOD AND APPARATUS FOR OBTAINING A MORE ACCURATE MEASURE OF INPUT SEISMIC ENERGY

Frederick J. Barr, Jr.; W. Harry Mayne, and Clifford H. Ray, all of San Antonio, Tex., assignors to Petty-Ray Geophysial, Inc., Houston, Tex.

Filed Jan. 24, 1973, Ser. No. 326,178

Int. Cl. G01v 1/16

U.S. Cl. 340—15.5 CP 10 Claims




1. In seismic exploration in which seismic records are made of the waves received at seismic detectors after being emitted by a seismic source located beneath the surface and reflected from subsurface reflecing horizons, the method comprising:
   locating an auxiliary detector at a depth below the surface that is large compared to the depth of the seismic source below the surface;

transmitting seismic waves from the seismic source;
recording representations of the waves received at the auxiliary detector;
adjusting each of the amount of seismic energy transmitted by the seismic source and the depth of the seismic source and repeating the foregoing steps, whereby a library of recordings is generated for different parameters; and,
pairing the recordings thus made with seismic records made with substantially the same parameters.

**2.** In seismic exploration, a method of obtaining an accurate representation of the seismic waveform reflected from a deep reflecting horizon, comprising the steps of:
obtaining a representation of the waveform directly emitted by a seismic source located below the surface; and adding to said waveform a replication of said waveform of reversed polarity delayed in time by the seismic travel time between the source and the surface, of a wave emitted by the source and reflected by the surface.

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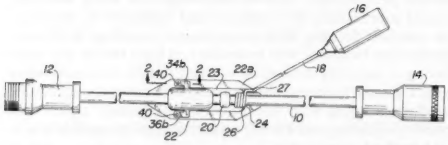
## 3,866,162
## GEOPHONE TAKEOUT ASSEMBLY FOR SEISMIC CABLES

**Eugene F. Florian, Houston, Tex., assignor to Mark Products, Inc., Houston, Tex.**

**Filed Mar. 15, 1973, Ser. No. 341,505**
**Int. Cl. G01s 9/66; G01v 1/16**
**U.S. Cl. 340—17** **5 Claims**




**1.** A geophone takeout assembly for connecting a geophone to a seismic cable having one or more conductors, a tensile member to take any tensile load on the cable, and an outer sheath of insulating material, said assembly comprising a takeout cable electrically connected between the conductors of the seismic cable and the geophone, a housing enclosing the electrical connection and a portion of the takeout cable for any tensile load imposed on the takeout cable by the geophone to be transmitted to the housing, and means connecting the housing to the tensile member of the seismic cable to transmit any forces imposed on the housing by the takeout cable to the tensile member of the seismic cable.

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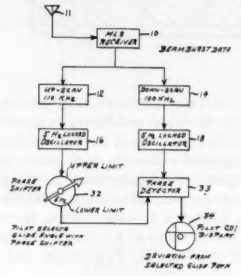
## 3,866,163
## ANGLE DATA PROCESSOR FOR RECIPROCATING NARROW SCANNING BEAMS

**George B. Litchford, Northport, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed July 2, 1973, Ser. No. 375,557**
**Int. Cl. G01s 1/18**
**U.S. Cl. 340—24** **8 Claims**

**1.** An angle data processor apparatus for reciprocating narrow scanning beams comprising in combination:
means for receiving first and second scanning signals, said first and second scanning signals being respectively modulated, said means for receiving detecting said first and second scanning signals and providing first and second detected output signals,
a first demodulating means receiving said first detected output signal from said means for receiving, said first demodulating means operating at a first demodulating frequency, said first demodulating means demodulating said first detected output signal to provide a first output pulse train in response to said first detected output signal,
a second demodulating means receiving said second detected output signal from said means for receiving, said second demodulating means operating at a second demodulating frequency, said second demodulating means demodulating said second detected ouput signal to provide a second output pulse train in response to said second detected output signal,
a first oscillator for oscillating at a first predetermined frequency, said first oscillator being connected to said first demodulating means and receiving said first output pulse train, said first oscillator being triggered by said first output pulse train, said first predetermined frequency being in response to said first output pulse train,
a second oscillator for oscillating at a second predetermined frequency, said second oscillator being connected to said




second demodulating means and receiving said second output pulse train, said second oscillator being triggered by said second output pulse train, said second predetermined frequency being in response to said second output pulse train,
detecting means for receiving said first and second predetermined frequencies, said detecting means detecting the phase difference between said first and second predetermined frequencies, said detecting means providing a voltage output signal in response to said phase difference, and
a display means receiving said voltage output signal, said display means providing a visual display of said voltage output signal.

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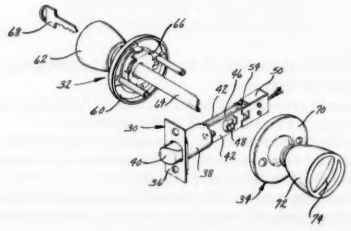
## 3,866,164
## SECURITY SYSTEM AND LOCK THEREFOR

**Francis C. Peterson, St. Louis County, Mo., assignor to Hinge Manufacturing Company, St. Louis, Mo.**

**Filed May 22, 1973, Ser. No. 362,662**
**Int. Cl. G08b 13/08**
**U.S. Cl. 340—274** **16 Claims**




**1.** In a security system including a door which opens from a door frame having a strike thereon, an alarm connected with the door for signalling when the door is open, and a lock for securing the door in a closed position, the lock including a latch blot which is normally urged beyond the edge of the door for engagement with the door frame to secure the door in a

closed position, and movable operating means engageable with the latch bolt to retract the latch bolt when the operating means is moved, the latch bolt being retractable independently of the operating means to enable the latch bolt to retract upon engaging the strike of the door frame without moving the operating means; the improvement comprising switch means connected to the alarm for deactivating the alarm for a limited time when said switch means is operated, the switch means being operatiedby the operating means when the operating means is moved such that it retracts the latch bolt.

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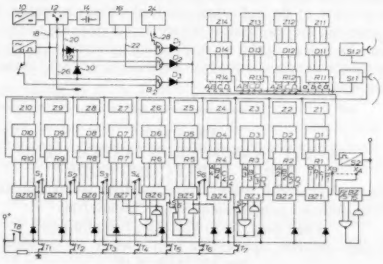
## 3,866,165
## DEVICE FOR MONITORING TRAFFIC

**Herbert Maronde, Dusseldorf, and Jurgen Holzapfel, Neub, both of Germany, assignors to Robot Foto Und Electronic GmbH & Co. KG, Dusseldorf-Benrath, Germany**

**Filed June 27, 1973, Ser. No. 373,966**
**Claims priority, application Germany, July 13, 1972, 2234446**
**Int. Cl. G08g** *1/10*
**U.S. Cl. 340—31 C** **10 Claims**



1. In an apparatus for monitoring the traffic at a road intersection at which there is a traffic control light having a "stop" period, said apparatus including a time meter which computes the local time and having a time display means which displays the local time as computed and a camera which is actuated, by a vehicle driving into the intersection, to photograph both the intersection and the time meter display means, the improvement comprising:

said time meter computes the time with an accuracy of at least one-tenth of a second;

a time display device positioned to be also photographed by said camera when a photograph is taken of said intersection and said meter; and

memory means connected to said time meter and said time display device to transfer to said display device the local time as computed by said time meter at the beginning of said "stop" period during which the photograph was taken.

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## 3,866,166
## DIGITAL MULTIGAGE FOR MOTOR VEHICLE

**William J. Kerscher, III, Flint, Mich., and Daniel A. Crawford, Boulder, Colo., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 9, 1974, Ser. No. 459,390**
**Int. Cl. G08b** *19/00*
**U.S. Cl. 340—52 F** **5 Claims**

1. Motor vehicle condition monitoring apparatus comprising:

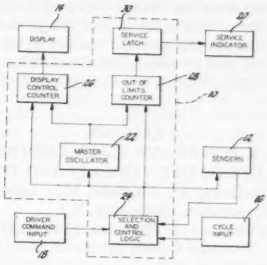
timer means, including a plurality of selectively connectable variable resistance sensor means, for establishing when enabled a time interval related to the status of the sensor selected,

oscillator means, including a plurality of selectively connectable calibrating resistor means, for producing an output signal at a frequency dependent on the calibrating resistor means selected, each calibrating resistor means being associated with a sensor means so that a particular calibrating resistor means is selected in conjunction with a particular sensor means,

counter means adapted when enabled to be clocked from said oscillator means,

display means adapted when enabled to display the digital value of the count stored in said counter means,

counter and display control means responsive to selection of each of said sensor means for enabling said timer




means and said counter means and for disabling said display means, said control means responsive to the termination of said time interval for enabling said display means and for disabling said counter means,

automatic selection means for periodically selecting one of said sensor means and the associated frequency output of said oscillator means,

cycle selection means for sequentially selecting each of said sensor means and the associated frequency output of said oscillator means,

individual selection means for selecting other than said one of said sensor means and the associated frequency output of said oscillator means.

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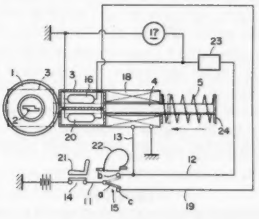
## 3,866,167
## DEVICE FOR COMPELLING RIDERS TO WEAR SEAT BELTS ON AUTOMOBILES

**Katsumi Hirano, Nagoya, Japan, assignor to Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho, Nishikasugai-gun, Aichi-pref., Japan**

**Filed May 29, 1973, Ser. No. 364,641**
**Claims priority, application Japan, June 1, 1972, 47-54662**
**Int. Cl. B60q** *9/00;* **B60r** *21/10*
**U.S. Cl. 340—52 E** **2 Claims**



1. A device for compelling riders to wear seat belts in automobiles comprising a keyhole blocking means movable between keyhole blocking and opening positions relative to a keyhole of an ignition switch, an armature rod fixed to one end of the keyhole blocking means, an electromagnetic sole-

noid coil movably supporting the armature rod, the armature rod being movable through the electromagnetic solenoid coil, a spring normally biasing the keyhole blocking means to the keyhole opening position when the solenoid coil is not energized, two lamps disposed in the keyhole blocking means, one of the lamps being for showing a condition where a rider is not wearing a seat belt, the other lamp being for showing a condition where the rider wears the seat belt, a seat switch operably associated with the driver's seat and movable to closed position when the driver sits down on the seat, a change-over switch having a movable contact and two stationary contacts, a circuit including the seat switch, said other lamp, the movable contact and one of the stationary contacts of the change-over switch in series, a detecting circuit including the other stationary contact of the change-over switch and the electromagnetic solenoid coil in series and being connected to the seat switch through the movable contact of the change-over switch in series, and a warning circuit including said one lamp connected to the detecting circuit in parallel.

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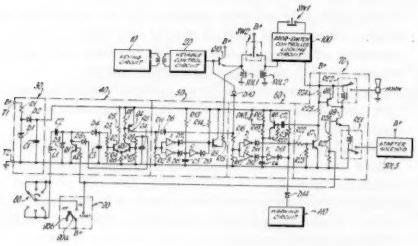
**3,866,168**

## DOOR LOCK, POWER AND ALARM CONTROL CIRCUIT FOR AUTOMOTIVE VEHICLES AND THE LIKE

**Francis A. McGuirk, Jr., Chatham, N.J., assignor to Wager Electric Corporation, Parsippany, N.J.**

**Filed Jan. 15, 1973, Ser. No. 323,827**
**Int. Cl. B60r** *25/04, 25/10*
**U.S. Cl. 340—64** **15 Claims**



1. In a vehicle including door lock control means operative when keyed to generate a control signal, an engine, engine-driven electrical spark distributor means, a starting switch for said engine, and warning means, the improvement comprising: circuit means coupled to said door lock control means, to said distributor means, to said starting switch, and to said warning means, and normally operative in the absence of said control signal to actuate said warning means upon actuation of said starting switch, and operative in response to said control signal to disable said warning means for a predetermined period of time from the termination of said control signal and to enable engine start-up by actuation of said starting switch within said predetermined period of time, and further operative to receive a pulse train generated by said distributor means during periods of vehicle engine operation, and operative in response to cessation of said pulse train to disable said warning means for a predetermined period of time after cessation of said pulse train and to enable engine restarting by actuation of said starting switch within said predetermined period of time.

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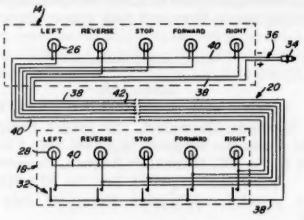
**3,866,169**

## VEHICLE SIGNALLING APPARATUS

**Claude R. Haglund, 7718 Pecan Wood Dr., Hitchcock, Tex. 77563**

**Filed Mar. 9, 1973, Ser. No. 339,950**
**Int. Cl. B60q** *1/26*
**U.S. Cl. 340—79** **9 Claims**

1. A remote signalling system for transmitting maneuvering commands to a mobile land vehicle having a source of electrical energy, comprising a signal receiving device positioned within the vehicle, a transmitter device located externally of the vehicle, each of said devices mounting a plurality of corresponding signal indicators representing said maneuvering commands, elongated, flexible cable means anchored externally on said vehicle and interconnecting said devices for simultaneous energization of the corresponding indicators




respectively mounted on said devices, connector means connecting said receiving device to the vehicle source of electrical energy for supply of energy to said cable means to effect said energization of the indicators, and selectively actuated means mounted on the transmitter device and connected to the cable means for selecting the corresponding indicators energized by said source in accordance with desired ones of said maneuvering commands.

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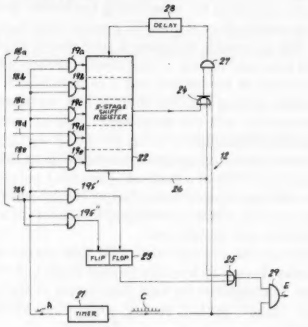
**3,866,170**

## BINARY TRANSMISSION SYSTEM USING ERROR-CORRECTING CODE

**Federico Verzocchi, Milan, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy**

**Filed Sept. 24, 1973, Ser. No. 400,060**
**Claims priority, application Italy, Oct. 3, 1972, 30001/72**
**Int. Cl. H04l** *1/10*
**U.S. Cl. 340—146.1 AL** **8 Claims**




1. A system for the transmission of binary words, each word consisting of $n + 1$ bits, comprising:

a first shift register with $n$ stages for receiving $n$ bits of a word to be transmitted;

first feedback means connected to said first shift register for sequentially developing an $n$-bit combination stored therein into an invariable cyclic succession of $2^n-1$ $n$-bit combinations starting with the combination originally stored;

first stepping means connected to said first feedback means for driving said first shift register through a full cycle of $2^n-1$ combinations with resulting generation of a maximum sequence of $2^n-1$ bits in any stage thereof;

a second shift register provided with second feedback means, said first and second feedback means each com-

prising an Exclusive-OR gate with input connections to the $n^{th}$ stage and to a lower-ranking stage of the associated shift register;

second stepping means substantially duplicating said first shift register, first feedback means and first stepping means, respectively, for generating maximum comparison sequences of $2^n-1$ bits each;

timing means operable at the beginning of a frame of at least $2^n-1$ cycles of said second stepping means for introducing into said second shift register an $n$-bit reference combination recurring every $2^n-1$ steps, each cycle of said second stepping means consisting of a number of steps greater than $2^n-1$ whereby each cycle of a frame begins with a different starting combination in said second shift register;

storage means connected to said receiving means for preserving an incoming maximum sequence over $2^n-1$ cycles of said second stepping means;

comparator means connected to said storage means and to a stage of said second shift register for successively comparing the bits of said incoming maximum sequence with the bits of all $2^n-1$ comparison sequences emitted by the last-mentioned stage in the course of a frame, said comparator means including a counter for registering the number of bit coincidences between said incoming sequence and any one comparison sequence;

numerical discriminator means connected to said counter for generating an output signal upon the number of bit coincidences in any cycle of said second stepping means deviating by more than a predetermined amount from a mismatch-indicating count of $[(2^{n-1}-1)/2] \pm \frac{1}{2}$;

output means connected to said discriminating means and controlled by said timing means for extracting from said second shift register the starting combination of the cycle in which said output signal is generated; and

an ancillary stage for the $(n+1)^{th}$ bit of a word and a further Exclusive-OR gate with input connections to said one stage of said first shift register and to said ancillary stage for converting the generated maximum sequence into its complement in the presence of a finite $(n+1)^{th}$ bit.

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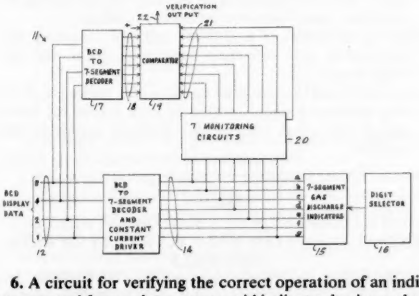
## 3,866,171
## DISPLAY VERIFIER

**Richard C. Loshbough, Temperance, Mich., assignor to Reliance Electric Company, Toledo, Ohio**

**Filed Jan. 18, 1974, Ser. No. 434,606**
**Int. Cl. H03k *13/32*; G08b *9/06***
**U.S. Cl. 340—146.1 C** **7 Claims**




**6.** A circuit for verifying the correct operation of an indicator operated from a data source, said indicator having a plurality of electrically energized character forming segments which become illuminated when energized, each segment having a first high voltage drop when open-circuited, a second voltage drop lower than such first voltage drop when illuminated, a third voltage drop lower than such second voltage drop when extinguished and a fourth voltage drop lower than such third voltage drop when short-circuited, said apparatus comprising, in combination, means responsive to data from the source for selectively energizing said indicator segments to define predetermined characters, a comparator having two corresponding groups of inputs, said comparator generating a verification signal when the two groups of inputs are identical and an error signal when the two groups of inputs are different, means for applying the data from the source to a first of said groups of comparator inputs, a plurality of electronic switch means, means connecting a different one of said switch means to each of said indicator segments for monitoring the voltage drop across said segments, each of said switch means having a first state of conducion when the voltage drop across the connected segment exceeds a predetermined voltage between said second and third voltage drops and a second state of conduction when the voltage drop across the connected segment is less than the predetermined voltage, and means connecting said switch means to the second of said groups of comparator inputs, said connecting means applying signals on said second group of comparator inputs corresponding to the signals on the first group of inputs when all of the indicator segments are illuminated and extinguished in accordance with the data from the source and applying a different input for any segment which fails to illuminate or extinguish in accordance with the data from the source.

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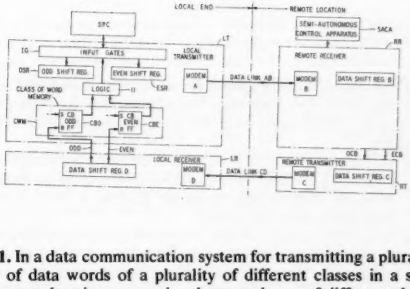
## 3,866,172
## COMMUNICATION SYSTEM FOR TRANSMITTING DATA WORDS PRIOR TO RECEIPT OF ACKNOWLEDGMENTS FOR PREVIOUSLY TRANSMITTED DATA WORDS

**Lionel Caron, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 16, 1974, Ser. No. 470,409**
**Int. Cl. H04q *9/00***
**U.S. Cl. 340—147 R** **12 Claims**




**1.** In a data communication system for transmitting a plurality of data words of a plurality of different classes in a sequence wherein consecutive data words are of different classes, each data word containing therein data plus a designation of the class to which that data word belongs, a transmission control arrangement comprising,

transmitting means for transmitting said data words to a remote location,

receiving means for receiving class acknowledgments from said remote location, each acknowledgment defining the class of a data word received at said remote location,

memory means,

storing means controlled by said transmitting means for storing, with respect to each transmitted data word, a class indication in said memory means specifying the class of said each transmitted data word,

clearing means controlled by said receiving means for clearing from said memory means the class indication of the class defined by each received class acknowledgment, and

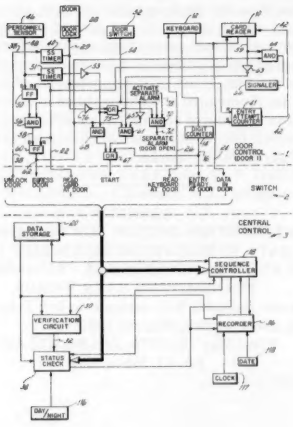
inhibiting means controlled by said memory means for inhibiting transmission by said transmitting means of other data words of each class specified by a class indication stored in said memory means.

3,866,173

## ACCESS CONTROL SYSTEM FOR RESTRICTED AREA

Charles J. Moorman; Frederick A. Reuter, both of Cincinnati, Ohio; Daniel F. Yorke, Brookfield Center, Conn., and Martin R. Meyer, Cincinnati, Ohio, assignors to The Mosler Safe Company, Hamilton, Ohio

Filed Oct. 2, 1973, Ser. No. 402,703
Int. Cl. G06k 3/00
U.S. Cl. 340—149 A 17 Claims



1. An access control system for controlling movement into and out of a restricted area through a door by personnel having an identification card; the system comprising, in combination;

a remotely controllable door lock mechanism for selectively permitting the door to the restricted area to be opened in response to door unlock signals, said door lock mechanism being normally locked,

a personnel detector within the restricted area to detect a person within said restricted area adjacent said door and in response thereto to generate a personnel signal,

a door sensor for producing a door open signal when the door to the restricted area is open;

an egress detector responsive to the occurrence of said door open signal and personnel signal to produce an egress signal;

a personnel identification card reader located outside the restricted area for reading card data from a personnel identification number;

a central control responsive to said egress signal to provide a read signal to said card reader;

a recorder;

said central control including means operative to receive the personnel identification number from said card reader and to actuate said recorder to record that an egress has occurred and the personnel identification number from the card read by said card reader; and

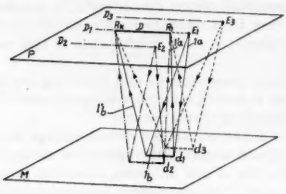
said central control including further means operative to produce a door unlock signal to unlock said door in response to specified conditions including reading of a card inserted in said reader by a person outside said restricted area seeking entry who inserts a personnel identification card in said reader when the door is locked.

3,866,174

## METHOD OF EXPLORING A MEDIUM AND ITS APPLICATIONS IN SEISMIC EXPLORATION

Maurice Barbier, Ousse, France, assignor to Societe Nationale Des Petroles D'Aquitaine, Paris, France

Filed May 15, 1973, Ser. No. 360,435
Claims priority, application France, May 19, 1972, 72.18172
Int. Cl. G01v 1/22
U.S. Cl. 340—15.5 TA 8 Claims



1. A method of exploring a medium which comprises the steps of:

transmitting into said medium a sequence of waves in the form of a long continuous signal from a plurality of spaced emission sources, at least two of said sources transmitting signals of opposite polarity,

actuating said plurality of emission sources for transmission at different times, the time interval between successive emissions of any two sources being less than the sum of the duration of emission by the first of said plurality of emission sources and the time $\alpha$ corresponding to the largest distance covered by the waves in the medium explored,

said times of actuating the emission sources and the polarity of the signals selected such that the cross-correlation function over the length of time $\alpha$ of the sequence of times at which emission of all sources begin, each time being combined with the polarity of the corresponding emitted signal, with the sequence of times at which at least one source begins emitting, said times being each combined with the polarity of the corresponding emitted signal, has a ratio of the amplitude of the maximum peak to the amplitude of each of the secondary residues which is greater than the ratio of the amplitude of the long signals received after intercorrelation with a reference of the long signals emitted by each of the sources for intervals of time corresponding to the intervals separating the maximum peak from said secondary residues,

receiving by means of a receiver unit and recording said long signals after reflection from reflectors in said medium, and

crosscorrelating the recorded signals with a reference of the long oscillatory signal emitted by each source for determining the travel time of the reflected signals in said medium.

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3,866,175

## DATA COMMUNICATION SYSTEM BETWEEN A CENTRAL COMPUTER AND A PLURALITY OF DATA TERMINALS

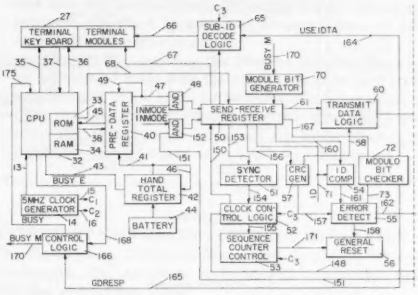
Lloyd R. Seifert, Jr., Cambridge, and Joel H. Hinrichs, Jr., Pleasant City, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 24, 1974, Ser. No. 463,627
Int. Cl. H04q 5/00
U.S. Cl. 340—152 R 25 Claims

1. A system for transmitting data between a central processor and a group of data terminals which includes active and inactive terminals, the group of data terminals coupled to the central processor through a controller which formats a polling

message to only those terminals which are active wherein the improvement comprises:

a. storage means for storing and outputting a plurality of control signals each representing the active or inactive state of a corresponding terminal;




b. and means detecting the output control signal of said storage means for formatting a polling message, said detecting means being enabled to format a polling message to the terminal corresponding to the output signal of said storage means upon detecting an output signal indicating that the corresponding terminal is in an active state.

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**3,866,176**

## ADDRESS SELECTION CIRCUIT FOR STORAGE ARRAYS

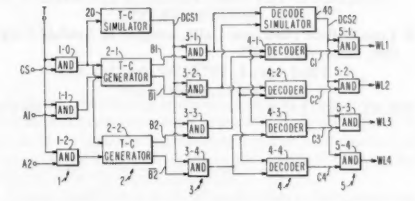
**Utz G. Baitinger, Stuttgart; Werner Otto Haug, and Manfred Illi, both of Boeblingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 31, 1974, Ser. No. 438,159**

**Claims priority, application Germany, Aug. 11, 1973, 2340814**

**Int. Cl. H04q** *3/00*

**U.S. Cl. 340—166 R** **15 Claims**




1. A logic circuit for providing a delayed logical output signal on an output terminal, comprising:

a first logic gating means for performing a predetermined logic function and for providing an inherently delayed output signal, said first logic gating means being responsive to at least one input signal;

output gating means responsive to said first logic gating means for providing a logical signal to said output terminal corresponding to said predetermined logic function, said output gating means also being responsive to an output gating clock pulse; and

clock pulse generating means for generating said output gating clock pulse after said first logic function has been performed, said clock pulse generating means comprising a second logic gating means for simulating the inherent time delay of said first logic gating means and for always providing a true logical output signal in response to at least one of said input signals.

**3,866,177**

## REMOTE CONTROL UTILIZING PULSED BEAM OF LIGHT FREQUENCY

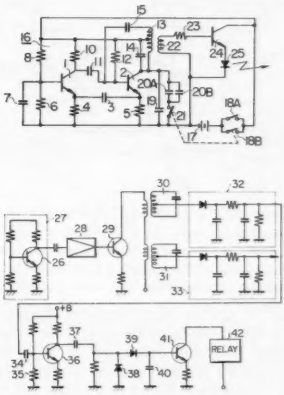
**Yukio Kawamata; Keisuke Yamamoto, both of Ibaragi, and Hiroshi Mouri, Nagaokakyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Aug. 9, 1973, Ser. No. 387,168**

**Claims priority, application Japan, Aug. 12, 1972, 47-80965; Aug. 12, 1972, 47-80966; Aug. 12, 1972, 47-80967**

**Int. Cl. H04q** *9/00;* **H04b** *9/00*

**U.S. Cl. 340—171 R** **10 Claims**




1. A remote control system including a transmitter and a receiver, said transmitter transmitting a remote control light signal for controlling a distant controllable device such as a television receiver: said transmitter comprising light generating means for generating and directing the remote control light signal toward said receiver for controlling said controllable device, oscillator means for modulating said light signal at a high frequency, multivibrator means having at least two transistors for intermittently operating said oscillator means at a low frequency to modulate the high frequency modulated light signal at the low frequency, wherein said oscillator means is in common with at least one of said two transistors of said multivibrator means; and said receiver comprising receiver means for receiving the high frequency modulated light signal further modulated at the low frequency transmitted from said transmitter, signal selection means for selectively taking out only a first signal of a frequency equal to said high frequency from the received light signal, detector means for detecting a second signal, corresponding to the low frequency, from said first signal to generate a corresponding output signal, and means for controlling said controllable device by the output signal.

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**3,866,178**

## FREQUENCY DIVISION MULTIPLEX SWITCHING SYSTEM

**Jean Jacques Muller, Garches, and Andre Jean Henquet, Boulogne, both of France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed May 1, 1974, Ser. No. 465,767**

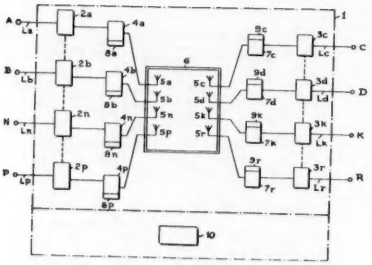
**Claims priority, application France, May 22, 1973, 73.18456**

**Int. Cl. H04j** *1/18*

**U.S. Cl. 340—171 R** **7 Claims**

1. Frequency-division switching system for interconnecting terminal equipment in a telecommunication exchange through

RF means using a closed common volume as a transmission medium electromagnetically shielded from the exterior, each terminal equipment comprising a tunable transmission and a tunable reception device with control means for tuning the respective frequencies of their respective transmission and reception devices, detecting means associated with the reception device of each terminal equipment, said detecting means



responsive to one or more signaling frequencies received through an RF transmission equipment and means for controlling suitable switching operations in accordance with the received signaling frequencies, and sending means associated with each transmission device to transmit one or more signaling frequencies to the detecting means associated with another terminal equipment so as to control switching operations in the other terminal equipment.

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**3,866,179**

## NUMERICAL CONTROL WITH ENVELOPE OFFSET AND AUTOMATIC PATH SEGMENT TRANSITIONS

**John K. McGee, Houston, Tex., and Norbert C. Kolell, Fond Du Lac, Wis., assignors to Gidding & Lewis Inc., Fond du Lac, British W. Indies**

**Filed Sept. 22, 1972, Ser. No. 291,319**
**Int. Cl. G06f** *15/46;* **G05b** *19/24;* **G06f** *15/20*
**U.S. Cl. 340—172.5** **36 Claims**

**1.** In a control system for moving the center of a tool at a velocity V along a path which is offset perpendicularly by a distance Q from successive main path segments defined by successive blocks of numerical data, the combination comprising

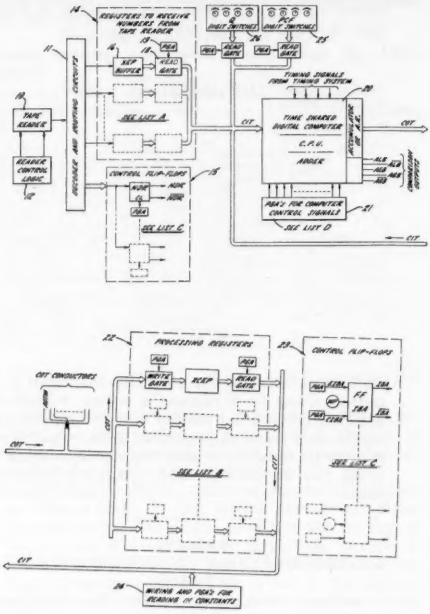
a. means including storage registers for storing and outputting first signals representing X and Y axis coordinate numbers XCP and YCP,

b. means for controlling said means (a) to change said first signals, and the represented values XCP and YCP, by amounts $\Delta X$ and $\Delta Y$ during each of successive equal time periods $\Delta T$, so that such first signals dynamically designate the location of a point moving progressively along the main path,

c. means including storage registers for storing and outputting second signals representing numbers QX and QY which are the X and Y components of a vector of length Q initially lying perpendicular to the main path,

d. means for controlling said means (c) to change said second signals and the represented values QX and QY during each of said periods $\Delta T$, when the block of data for the main path segment defines such segment as a circular arc of radius R, by respective amounts $QX\Delta = QY \cdot V \cdot \Delta T/R$ and $QY\Delta = QX \cdot V \cdot \Delta T/R$, and

e. means responsive to said first and second signals from said means (a) and (c) for moving the center of the tool simultaneously along X and Y axes to keep its position



coordinates substantially and dynamically equal to XCP + QX and YCP + QY during each period $\Delta T$.

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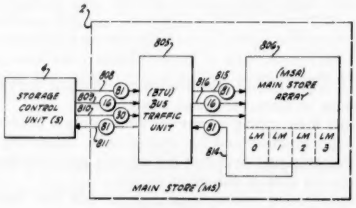
**3,866,180**

## HAVING AN INSTRUCTION PIPELINE FOR CONCURRENTLY PROCESSING A PLURALITY OF INSTRUCTIONS

**E. Leon Willette, San Jose, Calif., assignor to Amdahl Corporation, Sunnyvale, Calif.**

**Filed Apr. 2, 1973, Ser. No. 347,211**
**Int. Cl. G06f** *13/00*
**U.S. Cl. 340—172.5** **16 Claims**



**1.** In a data processing system having a high-speed buffer store and one or more low-speed stores, the improved low-speed store comprising,

a first array of integrated semi-conductor chips and a second array of integrated semi-conductor chips wherein said chips each contain storage locations and are energized during a charging period cyclically followed by deenergization during a discharging period and wherein information is read into or from addressed locations of

accessed ones of said chips during said discharging period,

addressing means connected in common to said chips in said first and second arrays for addressing in common locations of said chips in said first and second arrays,

data access means connected in common to said chips in said first and second arrays for transmitting information between addressed locations of accessed ones of said chips and said buffer store,

control means for accessing the chips of said first array on an interleaved basis with the chips of said second array whereby the chips in said first array are being charged when the chips in said second array one being discharged when the chips in said first array are being discharged when the chips said first array are being discharged.

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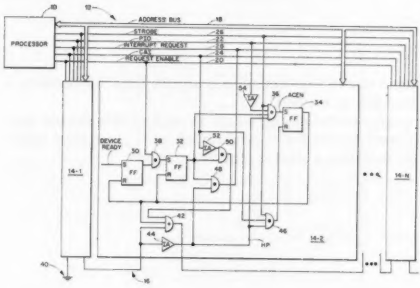
**3,866,181**

## INTERRUPT SEQUENCING CONTROL APPARATUS

**Byron G. Gayman, Holliston, Mass., and Russell A. Henzel, Doylestown, Pa., assignors to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Dec. 26, 1972, Ser. No. 318,138**
**Int. Cl. G06f 9/18**
**U.S. Cl. 340—172.5** **11 Claims**




1. Interrupt sequencing apparatus coupled in a system having a data processor connected to provide interrupt service in response to an interrupt signal from any one of a plurality of devices, said devices connected in an interrupt priority arrangement, said apparatus comprising:

A. means, included in each of said devices, for generating said interrupt signal indicating that said respective device is ready to request interrupt service from said processor;

B. interrupt priority means, coupled with each of said devices, for enabling the interrupt signal from the highest priority device;

C. means, responsive to the enabled interrupt signal from the highest priority device of said devices, for receiving an indication of the commencement of interrupt service for the highest priority device generating said interrupt signal;

D. means, included in each of said devices, for storing said interrupt signals generated either before or after said means for receiving provides the indication of the commencement of said interrupt service; and

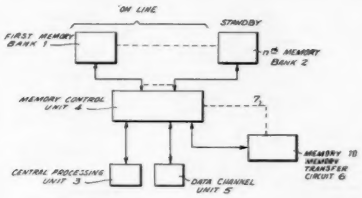
E. means, responsive to the completion of the interrupt service of said highest priority device generating said interrupt signal, for enabling the highest priority device which has stored an interrupt signal to request interrupt service from said processor.

**3,866,182**

## SYSTEM FOR TRANSFERRING INFORMATION BETWEEN MEMORY BANKS

**Hiroshi Yamada, and Yoshiro Yoshioka, both of Tokyo, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation-in-part of Ser. No. 866,567, Oct. 15, 1969, abandoned. This application July 18, 1973, Ser. No. 380,160**
**Claims priority, application Japan, Oct. 17, 1968, 43-75984**
**Int. Cl. G06f 13/00**
**U.S. Cl. 340—172.5** **4 Claims**




1. A system for transferring information between a plurality of memory banks, comprising a plurality of memory banks, each of said memory banks having the same performance and capacity, at least one of said memory banks being an operating memory bank while at least one other of said memory banks serves as a standby memory bank, processing means addressing to said operating memory bank for reading information, said processing means including a central processing unit and a data channel unit, a memory control means controlling the transfer of information according to the requirements of address received by said processing means or memory to memory transfer circuit means, said memory control means including a priority setting circuit operable to give permission of said addressing to said processing means rather than said memory to memory transfer circuit means if requirement by processing means and requirement by memory to memory transfer circuit means occur at the same time, said processing means continuing the processing during transferring information in said operating memory bank to said standby memory bank and said memory to memory transfer circuit means connected to transfer the information from said operating memory bank to said standby memory bank, said memory to memory transfer circuit being operable to write the information into the address of a standby memory bank which corresponds to the address of an operating memory bank in which said processing means writes the information during the switching of memory banks, said standby memory bank then becoming the operating memory bank.

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**3,866,183**

## COMMUNICATIONS CONTROL APPARATUS FOR THE USE WITH A CACHE STORE

**Ronald E. Lange, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Aug. 31, 1973, Ser. No. 393,358**
**Int. Cl. G06f 13/00**
**U.S. Cl. 340—172.5** **7 Claims**

1. A processor communications control apparatus for controlling the retrieval of data information from either an addressable cache store in an electronic data processor or an addressable main memory store according to store address signals identifying the store location of the data information, said apparatus comprising:

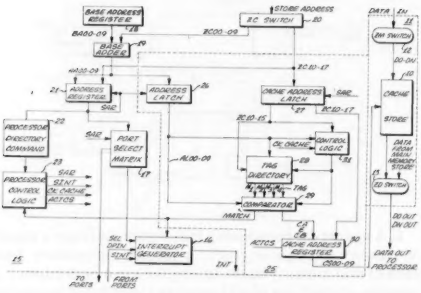
command means for generating timing signals in response to the store address signals;

a base adder connected to said command means and to receive said store address signals for adding a base address portion to the store address signals in response to a first timing signal;

checking means for checking the cache store for the data information according to the store address signals;

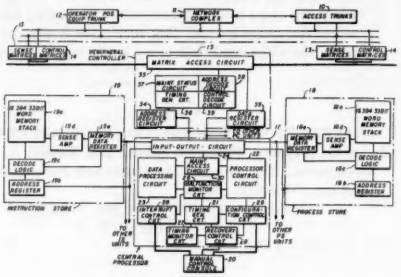
comparator means connected to said checking means for generating a match signal in response to the determination that the data information is in the cache store;

a port means connected to receive the added address signals from said base adder for providing a communication connection between the processor and the main memory store;



an interrupt generator for generating an interrupt signal to the main memory store to provide communication access between the processor and the main memory store through said port means in response to a second timing signal from said command means and a signal from the port means that a communication connection is available; said match signal being generated before the occurrence of said second timing signal, said match signal controlling said interrupt generator to inhibit the generation of said interrupt signal.

timing level check circuit means receiving said timing level signals on multiple mutually exclusive circuit means from its associated timing generator circuit means for generating a timing level error level signal either when said timing level signals occur out of a predetermined order or



when one of said timing level signals does not occur in a machine cycle; and

recovery control circuit means in each of said central processors responsive to said timing level error level signal for initiating a system recovery program.

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**3,866,184**

## TIMING MONITOR CIRCUIT FOR CENTRAL DATA PROCESSOR OF DIGITAL COMMUNICATION SYSTEM

**Rolfe E. Buhrke, La Grange Park; Gregory I. Chang, Oak Park, and Edward M. Horiuchi, Skokie, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Aug. 31, 1973, Ser. No. 393,543**
**Int. Cl. G08c** *25/00*
**U.S. Cl. 340—172.5** **15 Claims**

1. In a data processing system having first and second central data processors each including processing circuits and maintenance circuits, said system being adapted wherein only one of said processors is active at one time and the other is standby, timing generating and monitoring circuitry for fault isolation comprising:

timing generator circuit means in each of said central processors for generating a plurality of sequentially occurring mutually exclusive timing level signals, a predetermined number of said timing level signals comprising a machine cycle, the timing generator circuit means in the active central processor transmitting said timing level signals to the other central processor;

timing monitor circuit means for each central processor and including

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**3,866,185**

## METHOD AND APPARATUS FOR GATHERING PEAK LOAD TRAFFIC DATA

**Richard Henry Etra, Highland Park, and Victor Llewellyn Ransom, New Shrewsbury, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 16, 1974, Ser. No. 433,780**
**Int. Cl. G06f** *3/04*
**U.S. Cl. 340—172.5** **14 Claims**

1. Apparatus for gathering peak load traffic data for signal communication circuits, said apparatus comprising,

means for sequentially and recurrently sampling signal states on said circuits,

means for counting separately, and over each of plural periodically recurring scan time intervals, specified signal state changes in samples for each of said circuits,

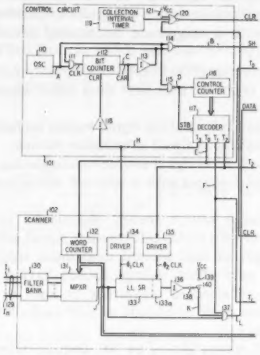
first memory means for storing current numbers of said specified signal state changes occurring in each of said circuits in a predetermined collection interval,

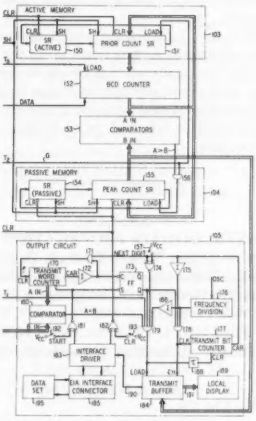
second memory means for storing peak numbers of said specified signal state changes occurring in each of said circuits during a predetermined measurement interval, a measurement interval being substantially larger than a collection interval,

means for comparing the current numbers of specified signal state changes stored in said first memory means with the peak numbers of specified signal state changes

stored in said second memory means, and

control circuit means for routing the larger of the two numbers of specified signal state changes ascertained by the comparison to said second memory means for storage.




## 3,866,186

## LOGIC CIRCUIT ARRANGEMENT EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTORS

**Yasoji Suzuki, Kawasaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan**

**Filed May 10, 1973, Ser. No. 358,877**

**Claims priority, application Japan, May 29, 1972, 47-52527; May 29, 1972, 47-52428; May 16, 1972, 47-47667**

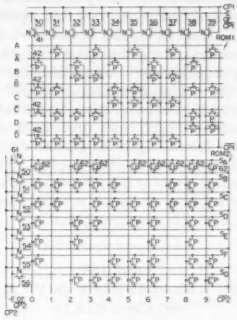
**Int. Cl. G11c** *11/40*

**U.S. Cl. 340—173 SP** **4 Claims**

1. A read only memory device which comprises:

a plurality of memory units each including one first insulated gate field effect transistor of one channel type having one gate electrode and a first and a second electrode forming a conduction path therebetween, and a plurality of second insulated gate field effect transistors of the opposite channel type to the first transistor each having one gate electrode and a first and a second electrode defining a conduction path therebetween, said conduction paths of said second transistors being connected in series with the conduction path of said first transistor, the second electrode of at least one of said second transistors being connected to the second electrode of said first transistor and an output from each memory unit being derived from the second electrode of said first transistor;

means for supplying the gate electrodes of said second transistors of each memory unit with data signals;



means for supplying the gate electrode of said first transistor of the respective memory units with a first clock pulse signal; and

means for supplying the first electrode of said at least one second transistor of the respective memory units with a second clock pulse signal complementary to said first clock pulse signal.

## 3,866,187

## METHOD OF RECORDING AND REPRODUCING INFORMATION IN FERROELASTIC METALS

**Joseph Patrick Dougherty, Ossining; Andrew Lawrence Dalisa, Yorktown Heights, and Robert John Seymour, Ossining, all of N.Y., assignors to North American Philips Corporation, Briarcliff Manor, N.Y.**

**Filed July 2, 1973, Ser. No. 375,785**

**Int. Cl. G11c** *13/00*

**U.S. Cl. 340—173 R** **10 Claims**

1. A method of recording, retrieving and erasing information comprising the steps of prestressing a ferro-elastic metal having a reversible elastic transition above a given temperature to deform the surface thereof, locally heating portions of said metal above its transition temperature to relieve strain in said portions in response to an information signal and to store the information as surface relief pattern in the metal, and thereafter scanning said surface to detect variations in surface relief therein.

## 3,866,188

## MEMORY CIRCUIT

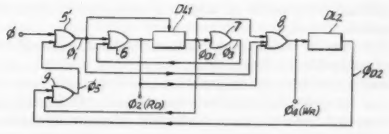
**Hiroshi Watanabe, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Mirato-ku, Tokyo, Japan**

**Filed Sept. 18, 1973, Ser. No. 398,339**

**Claims priority, application Japan, Sept. 19, 1972, 47-94371**

**Int. Cl. G11c** *11/40*

**U.S. Cl. 340—173 DR** **8 Claims**



1. A memory circuit having storage means for storing information signals includes means for performing a refreshing

operation in which said stored information signals are rewritten into said storage means and in which said stored information can be destroyed by termination of said refreshing operation within a first period of time during said operation, reset means for generating a first signal to terminate said refreshing operation and to reset said memory circuit to a predetermined condition, means responsive to said first signal to generate a rewrite signal, clamping means responsive to said rewrite signal for generating a clamping signal during a second period of time at least equal in duration to said first period of time during which the stored information in said storage means may be destroyed by the termination of said refreshing operation, said clamping signal being present at least from the beginning of said rewrite signal to the end of said first period of time, said clamping signal being applied to said first signal generating means to prevent the generation of said first signal, whereby said refreshing operation is caused to continue during the presence of said clamping signal.

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**3,866,189**

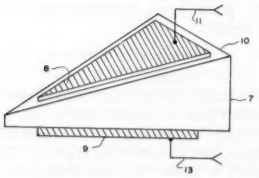
## RECORDING AND PLAYBACK DEVICE WITHOUT MOVING PARTS

**Judo Lewis Berger, 8614 Camden St., Alexandria, Va. 22308**

**Filed Feb. 16, 1973, Ser. No. 333,235**

**Int. Cl. G11c *11/22***

**U.S. Cl. 340—173.2** **6 Claims**




**1.** A recording system comprising a solid state storage means including at least one body of saturable material having a variable substantially rectangular hysteresis loop saturation characteristic and adapted to saturate at different electrical energization levels at different cross section points on a transverse axis through said body between first and second surface points, said body adapted to saturate at a relatively high electrical energization level in the vicinity of said first surface point and to saturate at progressively lesser electrical energization levels at points on said transverse axis spaced from said first surface point with the lowest energization level to saturate said body in the vicinity of said second surface point;

electrical energization means having an output substantially sufficient to saturate said body in the vicinity of said first surface point on said transverse axis, the output of said energization means electrically connected across said body in substantially orthogonal relation with respect said transverse axis;

information signal means adapted to decrease the output of said electrical energization means in accordance with input information at selected cross section points progressively distant from said first surface point on said transverse axis such that said input information is stored in defined increments at respective selected cross section points;

and means for connecting readout means across said body of saturable material;

wherein said body of saturable material comprises at least one ferroelectric capacitor means and said ferroelectric capacitor means has a dielectric of nonuniform cross section with conductive plates on opposing sides of said dielectric;

wherein said dielectric is wedge shaped and said plates of said ferroelectric capacitor means are also wedge shaped;

wherein said electrical energization means includes the following:

a first dual input signal summation means electrically connected across said body of saturable material,

a ramp generator means adapted to produce an output signal with a magnitude decreasing linearly with time; plus,

means connecting the output of said ramp generator means to one input of said first dual input signal summation means;

wherein said information signal means includes;

second dual input signal summation means,

audio information signal source means having an amplitude modulated output with a selected maximum peak amplitude,

offset voltage source means electrically connecting the output of said audio information signal source means to one input of said second dual input signal summation means, said offset voltage source having a DC output voltage of selected magnitude at least as great as said maximum peak amplitude of said audio information signal source,

bias signal means having an AC voltage output,

and means connecting the output of said bias signal means to the other input of said second dual input signal summation means;

and wherein said information signal means also includes variable attenuator means connecting the output of said second dual input summation means to the other input of said first dual signal summation means such that by selective adjustment of said variable attentuator, information may be stored at selected cross section points on said transverse axis.

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**3,866,190**

## MAGNETIC DOMAIN PROPAGATION DEVICE

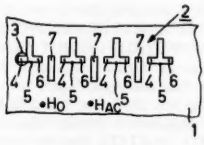
**Frederik Ate de Jonge; Willem Frederik Druijvesteijn; Antonius Gerardus Hendrikus Verhulst, and Ulrich Ernst Enz, all of Emmasingel, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 4, 1972, Ser. No. 294,909**

**Claims priority, application Netherlands, Oct. 14, 1971, 7114114**

**Int. Cl. G11c *11/14***

**U.S. Cl. 340—174 TF** **3 Claims**



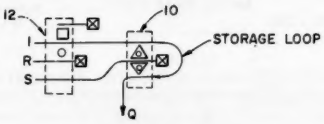

**1.** A magnetic device comprising at least one thin layer of a magnetisable material having an easy axis of magnetisation which is approximately at right angles to the surface of the layer, means for producing, maintaining and destroying magnetic domains in said layer, means for producing a driving force having a given frequency for transporting the domains in said layer, and means for producing an alternating magnetic field substantially at right angles to the propagation path having a frequency exceeding the frequency of a driving force present for the transport of a domain.

3,866,191

## NON-CONSERVATIVE BUBBLE LOGIC CIRCUITS

Robert C. Minnick, Houston, Tex.; Paul T. Bailey, Creve Coeur; Robert T. Sandfort, St. Charles, both of Mo., and Warren L. Semon, DeWitt, N.Y., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 1, 1972, Ser. No. 311,402
Int. Cl. G11c *11/14*
U.S. Cl. 340—174 TF 13 Claims




1. A magnetic bubble flip-flop logic circuit, comprising means defining at least three adjacent bubble tracks for transmitting magnetic bubbles, one of a pair of adjacent ones of said tracks having input means for generating during each cycle of operation a magnetic bubble representing "not reset" in the absence of a reset signal, another one of said pair of tracks having input means for selectively transmitting a bubble representing "set," and a loop track interconnecting the output of one of said pair of tracks with the input of a third one of said tracks, and logically controlled transfer means between said tracks for causing an output bubble to exit said third track when in a corresponding cycle there was "set" bubble or in the immediately preceding cycle there was a "not reset" bubble and there was a bubble in said loop track.

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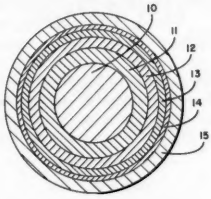
3,866,192

## PLATED WIRE MEMORY ELEMENT

Robert P. Ulmer, Minneapolis, and James O. Holmen, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 1, 1973, Ser. No. 337,227
Int. Cl. G11c *11/14*
U.S. Cl. 340—174 QA 12 Claims



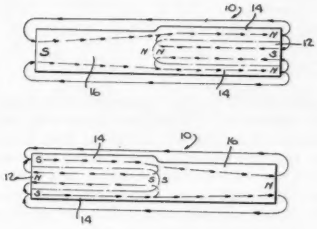

1. A plated wire memory element comprising:
a non-magnetic wire substrate,
a non-magnetic layer of controlled roughness overlaying said substrate,
a first zero magnetostrictive magnetic layer including nickel and iron overlaying said non-magnetic layer,
thin continuous film of controlled texture cobalt overlaying said zero magnetostrictive magnetic layer, and
a second zero magnetostrictive magnetic layer including nickel and iron overlaying said thin continuous layer.

3,866,193

## ASYMETRIC BISTABLE MAGNETIC DEVICE

John Richard Wiegand, Valley Stream, N.Y., assignor to Milton Velinsky, Plainfield, N.J. and John R. Weigand, Valley Stream, N.Y., part interest to each

Continuation-in-part of Ser. Nos. 247,356, April 25, 1972, Pat. No. 3,820,090, and Ser. No. 173,070, Aug. 19, 1971, abandoned, and Ser. No. 137,567, April 26, 1971, abandoned, and Ser. No. 86,169, Nov. 2, 1970, abandoned, and Ser. No. 189,027, Oct. 13, 1971, Pat. No. 3,783,249, and Ser. No. 5,632, Jan. 27, 1970, abandoned, and Ser. No. 269,525, July 7, 1972, Pat. No. 3,818,465, and Ser. No. 52,571, July 6, 1970, abandoned, and Ser. No. 173,706, July 22, 1971, Pat. No. 3,774,179. This application Nov. 15, 1973, Ser. No. 416,081
Int. Cl. G11c *11/12*
U.S. Cl. 340—174 ZB 16 Claims




1. In a unitary magnetic wire device having first and second magnetic portions wherein at least said first portion is capable of retaining net magnetization after being subjected to a magnetic field, the net coercivity of said first portion is substantially greater than the net coercivity of said second portion, said first portion has substantially the same chemical composition as does said second portion, and said portions are separated solely by a magnetic domain interface when said first portion has a net magnetization in a first direction and said second portion has a net magnetization in a second direction substantially opposite from said direction, the improvement comprising:
the configuration wherein said second magnetic portion is a core portion extending only partially along the axial length of the wire and said first magnetic portion includes a shell zone around said core and an end zone axially adjacent to said core.

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3,866,194

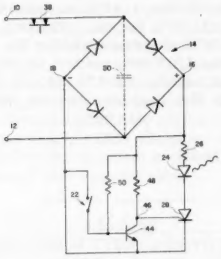
## ANNUNCIATOR CIRCUIT

Richard A. Lawton, 235 Cassandro Blvd., Apt. 717, Don Mills, Ontario, Canada

Filed Mar. 21, 1973, Ser. No. 343,571
Int. Cl. G08b *23/00*
U.S. Cl. 340—213 R 3 Claims

1. In an alarm signalling device having at least a single-pole single-throw switch whose operation is determined by a change of ambient conditions being monitored by said device, and where said switch is connected in series with one side of a source of electrical power; the improvement comprising annunciator means associated with said alarm signalling device and connected to said power source to provide a continuous annunciation after a switching operation of said switch in response to a change of the conditions being monitored until such time as said annunciator means is at least temporarily disconnected from said power source, including;
annunciator means operable from said power source and in series with gate means; said gate means being operable only upon operation of a control circuit therefor; said control circuit being active to control said gate means only after a switching operation of said switch;

said gate means including latch means connected to said power source to maintain said gate means closed and said annunciator means operative even after a further switching operation of said switch, until said latch means is disconnected from said power source; said gate and latch means being an SCR, and said annunciator means being a light emitting diode;



said control circuit for said gate means from having a transistor whose base is connected series with said switch; resistor means connected to bias the base of said transistor so that said transistor is conductive when said switch is in its normal switching condition; and further resistor means connected at one end both to said transistor and to the gate of said SCR, so that after a switching operation of said switch said transistor become non-conductive and said SCR is fired by the voltage then impressed on the gate thereof.

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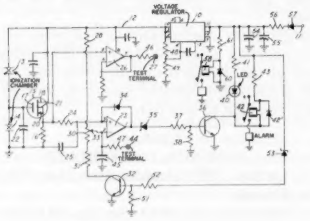
**3,866,195**

## COMBUSTION PRODUCT DETECTOR AND METHOD OF CALIBRATING

**Louis Ried, Jr., Boulder, Colo., assignor to Fire-Alert Company, Wheat Ridge, Colo.**

**Filed May 7, 1973, Ser. No. 358,041**
**Int. Cl. G08b** *17/10*
**U.S. Cl. 340—237 S** **8 Claims**



1. A combustion product detector of the ionization chamber type comprising:

a. a constant voltage direct current supply,

b. means including an air sampling ionization chamber and connected across said supply for producing an output signal proportional to the density of combustion product in the air of said chamber,

c. adjustable means including a resistance connected across said supply for providing a reference voltage representing a predetermined combustion product density in the chamber,

d. means for comparing said output signal and said reference voltage and for producing a second signal when said output signal and said reference voltage are substantially equal,

e. an alarm means, and

f. means responsive to said second signal for actuating said alarm means.

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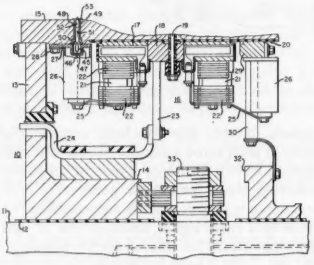
**3,866,196**

## BLOWN FUSE INDICATOR FOR ROTATING EQUIPMENT

**August C. Mann, Pittsburgh, and Thayer L. Dillman, North Versailles, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Aug. 1, 1973, Ser. No. 384,656**
**Int. Cl. H01h** *85/30*
**U.S. Cl. 340—250** **6 Claims**



1. In a rotating rectifier assembly including a rotatable support wheel having a plurality of rectifier circuit components mounted on a cylindrical rim thereof, a fuse mounted on the inner surface of said rim, the rim having an opening therethrough in alignment with the fuse, an indicator member disposed at one end of the fuse adjacent said opening, means for normally retaining said indicator member in position and for releasing the indicator member upon blowing of the fuse to permit the indicator member to move outward into the opening, and means for engaging the indicator member to limit its outward movement.

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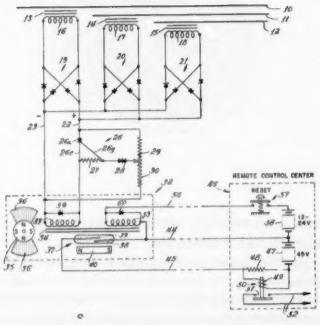
**3,866,197**

## MEANS FOR DETECTING FAULT CURRENT IN A CONDUCTOR AND INDICATING SAME AT A REMOTE POINT

**Edmund O. Schweitzer, Jr., Northbrook, Ill., assignor to E. O. Schweitzer Manufacturing Co., Inc., Mundelein, Ill.**

**Filed Dec. 10, 1973, Ser. No. 423,283**
**Int. Cl. G08b** *21/00*
**U.S. Cl. 340—253 A** **13 Claims**



1. Means for detecting flow of fault current in a high voltage alternating current carrying conductor and indicating the same at a remote point comprising: a fault responsive device

including a magnetic circuit, a fault responsive winding on said magnetic circuit, means for energizing said fault responsive winding with direct current according to the magnitude of flow of alternating fault current in said conductor, a reset winding on said magnetic circuit, and a normally open reed switch adjacent said magnetic circuit arranged to be closed on energization of said fault responsive winding resulting from flow of fault current in said conductor; indicating means at a said remote point connected to be responsive to closure of said reed switch, and means at said remote point for connecting said reset winding to a direct current source for reversing the magnetization of said magnetic circuit and opening said reed switch.

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**3,866,198**

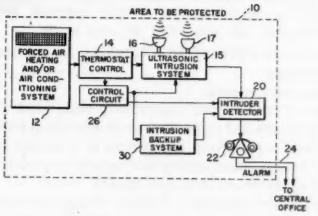
## ULTRASONIC INTRUSION DETECTION SYSTEMS EMPLOYING TURBULENCE DISCRIMINATION

**Leopold Cohen, 518 Seven Oaks Rd., Orange, N.J. 07051**

**Filed Oct. 17, 1973, Ser. No. 407,062**

**Int. Cl. G08b** *13/16*

**U.S. Cl. 340—258 A** **10 Claims**




**1.** In an intrusion detection system for monitoring a predetermined area, said system, when activated is of the type employing a selected frequency transmitter and a receiver responsive to said transmitted frequency as determined by a Doppler shift due to the presence of an intruder in said area, the combination therewith including apparatus for operating said system in said area in the presence of a generating source of air current turbulence, which source is selectively operated according to environmental conditions of said area, and which air turbulence can undesireably cause said intrusion system to falsely indicate the presence of said intruder, comprising:

a. first means including a thermostat responsive to the operation of said selectively operated generating source to provide a control signal indicative of said operation and therefore of said air turbulence,

b. second means coupled to said intrusion system and responsive to said control signal for deactivating said system during the presence of said control signal, whereby said intrusion system is monitoring said area only when said selectively operated source is not operating as determined by said environmental condition.

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**3,866,199**

## DEVICE FOR SCANNING A FUNCTION AND METHOD OF OPERATING THE SAME

**Hans-Joachim Eberhard, Lomar; Knud Overlach, Karlsruhe; Gerd Huhne, Morsch, and Ludwig Pietzsch, Karlsruhe, all of Germany, assignors to Ludwig Pietzsch, Karlsruhe, Germany**

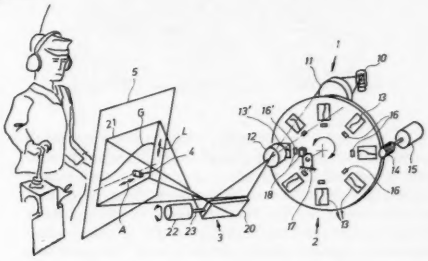
**Filed Apr. 19, 1972, Ser. No. 245,573**

**Claims priority, application Germany, Feb. 9, 1972, 2206065; Apr. 19, 1971, 2118896; Feb. 28, 1972, 2209396**

**Int. Cl. G08b** *21/00;* **B66c** *15/00*

**U.S. Cl. 340—267 C** **13 Claims**

**1.** Device for tracking the image of a function, comprising in combination carrier means for carrying at least one graphical representation of the pattern of a function, said carrier means including a rotary disc and a plurality of pattern representations disposed thereon about the circumference thereof, means for driving said rotary disc, and means for energizing said driving means with a signal representative of one variable of said function; an optical image-forming system for said function including an image-viewing screen, a source of illumination, means forming a defined path of illumination between said source and said screen, means for interposing said pattern in said path between said source and said screen, and means for displaying an image of said pattern on the screen; and a sensor operable to sense the image of the pattern on said screen; and means for effecting a relative movement between the image projected on the screen and said sensor according to variables of said function in relation to a fixed coordinate system.




**13.** Device for tracking the image of a function, comprising in combination carrier means for carrying at least one graphical representation of the pattern of a function including a film strip having a plurality of pattern representations disposed thereon; an optical image-forming system for said function including an image-viewing screen, a source of illumination, means forming a defined path of illumination between said source and said screen, means for interposing said pattern in said path between said source and said screen, and means for displaying an image of said pattern on said screen; and a sensor operable to sense the image of the pattern on said screen; and means for effecting a relative movement between the image projected on the screen and said sensor according to variables of said function in relation to a fixed coordinate system.

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**3,866,200**

## LOAD MEASURING AND OVERLOAD WARNING SYSTEM

**Candelario Paredes, Dallas, and Robert Horn, Richardson, both of Tex., assignors to Forney Engineering Company, Carrollton, Tex.**

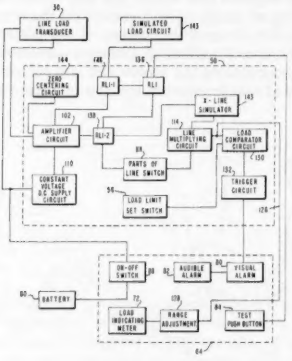
**Filed July 25, 1973, Ser. No. 382,402**

**Int. Cl. G08b** *21/00*

**U.S. Cl. 340—267 C** **4 Claims**

**1.** An improved load measuring and indication system for a multi-line hoisting rig, comprising means responsive to the tension of at least one load supporting line of such rig including, a transducer load cell associated with such line, a power pack for supplying a regulated constant voltage power to the system, a first amplifier circuit connected to said load cell for producing a signal that is proportional to the tension on such line by virtue of the load, a second amplifier for multiplying the signal by a signal corresponding to the number of lines of such rigging used in lifting the load, a selectable parts of line switch for setting such signal corresponding to the number of lines to be multiplied by such second amplifier, a third amplifier for comparing the total signal output of such second amplifier with a signal corresponding to desired load limit signal, selectable load limit switch means for establishing the signal corresponding to the desired load limit, trigger means responsive to the third amplifier operable for producing an output when the actual load signal to said third amplifier circuit reaches the desired load limit signal, display module

having a meter connected to said second amplifier for indicating the actual load signal output of the second amplifier circuit and a warning light and audible indicator energized by the trigger whenever the actual load reaches the desired load limit wherein the improvement comprises: relay means normally coupling the first amplifier with the load cell output and the




parts of line switch, and operative, when energized, for breaking said connections and coupling a test input to the first amplifier, and its output to an input for the meter, test circuit means for energizing the relay and coupling the test signal corresponding to a known load simulating signal to the first amplifier.

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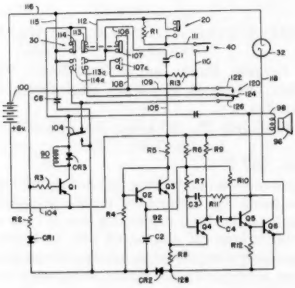
**3,866,201**
**SECURITY ALARM DEVICE**
**John L. Beiswenger, Pacific Palisades, Calif., assignor to National Presto Industries, Inc., Eau Claire, Wis.**
**Filed Nov. 22, 1972, Ser. No. 308,715**
**Int. Cl. G08b *13/08***
**U.S. Cl. 340—274** **19 Claims**



1. A security alarm device mountable on a door and including a tripping lever sensitive to the movement of a door relative to a stationary door frame to detect opening and closing of the door, the device comprising an annunciating alarm circuit, a control circuit including a normally open switch closeable to actuate the annunciating alarm circuit, a manually retractable actuator spring-biased toward an operating position where it closes the switch, and first and second latch means for releasably holding said actuator in retracted positions remote from said operating position, said latch means being operatively associated with the tripping lever so as to release the actuator from the first latch means when the lever senses the door has closed and to release the actuator to said switch operating position from the second latch means when the door re-opens.

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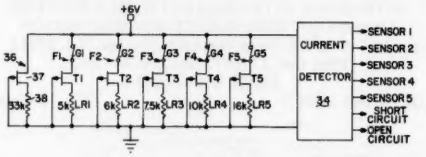
**3,866,202**
**ALARM CIRCUITRY**
**Martin H. Reiss, Newton, and James R. Adams, Framingham, both of Mass., assignors to Gulf & Western Manufacturing Company Systems, New York, N.Y.**
**Division of Ser. No. 153,297, June 15, 1971, Pat. No. 3,821,733. This application Oct. 29, 1973, Ser. No. 410,432**
**Int. Cl. G08b *13/08***
**U.S. Cl. 340—274** **12 Claims**




1. Alarm circuitry for use in a structure having entrance means, comprising;
current detection means,
a plurality of sensors each operatively associated with an entrance means and responsive to an activation thereof to change said sensor from a first state to a second state,
conductor means intercoupling said sensors in parallel to an input of said current detection means,
each said sensor including a current source for drawing a predetermined amount of current whereby each current source draws a different amount of current,
said detection means including means for registering a first condition when all said sensors are drawing current and means for registering a plurality of alarm conditions, each such alarm condition corresponding to activation of one of said sensors,
and an additional current source connected in parallel with said sensors.

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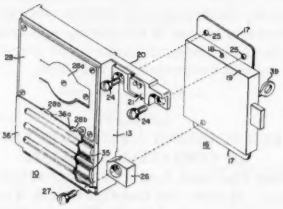
**3,866,203**
**AUDIBLE SIGNAL APPARATUS**
**Charles Berns, Brookfield, Conn., assignor to Edwards Company Inc., Norwalk, Conn.**
**Division of Ser. No. 205,094, Dec. 6, 1971, Pat. No. 3,742,493. This application Feb. 16, 1973, Ser. No. 333,232**
**Int. Cl. E05b *45/12***
**U.S. Cl. 340—274** **3 Claims**



1. Audible signal apparatus for manifesting a retraction of a lock bolt comprising in combination:
a. key actuated means for selectively retracting said lock bolt;
b. lock housing means including therein said lock bolt and having oppositely disposed mounting flanges for securing said lock housing means on a planar surface;

c. detent means extending through one side of said lock housing means and subject to movement in response to the retraction of said lock bolt;
d. a shallow housing means for said audible signal apparatus whose major walls are substantially parallel and are coupled together by side walls and end walls;
e. said shallow housing means including therein a horn having a diaphragm and an electromagnet for operating the diaphragm;
f. said shallow housing means having a mounting bracket extending in a plane parallel to one major wall thereof and adapted for permitting said bracket to overlap a flange of the lock housing means and yet maintain a major wall of the shallow housing means in the plane of said planar surface to which said lock housing means is secured; and
g. said bracket having a switch secured thereto in a position to be actuated when said detent is moved to energize said audible signal apparatus.

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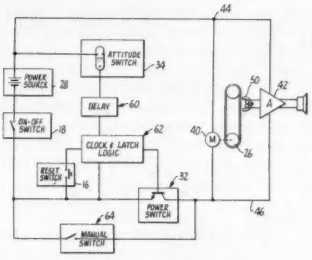
**3,866,204**

## ELECTRONIC MEDICAL WARNING DEVICE

**James H. Barkley, 1567 S. Jamaica, Aurora, Colo. 80012**

**Filed July 19, 1973, Ser. No. 380,768**
**Int. Cl. G08b *21/00***
**U.S. Cl. 340—279** **3 Claims**




1. A warning device to be attached to a person prone to incapacitating medical conditions or prostrating seizures comprising a warning signal annunciator which when activated repeatedly emits a recorded verbal message to inform bystanders of the nature of such person's condition or seizure and how he is to be treated prior to the arrival of medical aid, a power supply for the annunciator, and control means to connect the power supply with the annunciator, said control means comprising sensing means operable to sense the existence of a supine or non-erect position of the wearer of the device and to transmit a signal only during the time the wearer is in such position, a switch operable upon closure to connect the power supply to the annunciator despite a subsequent change in the wearer's position from supine to a normal one, and time delay means to receive said signal and in response to the receipt of said signal for a predetermined period of time to close said switch.

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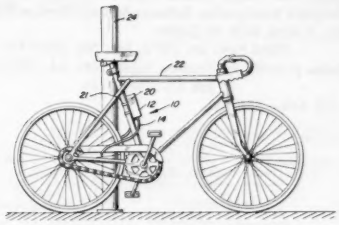
**3,866,205**

## LOCKING DEVICE WITH ALARM UTILIZING FLEXIBLE GAS IMPERMEABLE TUBE

**Louis B. Payne, 1465 Jersey St., and Russell G. Overgard, 950 Everett St., both of Denver, Colo. 80215**

**Filed Apr. 18, 1973, Ser. No. 352,254**
**Int. Cl. G08b *21/00***
**U.S. Cl. 340—280** **15 Claims**

1. A portable locking apparatus adapted to be mounted on a device to be locked, including an alarm means for detecting the tampering with of a portion of the locking apparatus, comprising:
a housing susceptible of being mounted on a device to be locked;
an alarm means located in said housing;
a sensing means located within said housing for actuating said alarm when a decrease in pressure is sensed by said sensing means; and




a flexible gas impermeable tube having a first end and a second end, said tube being adapted to encircle a portion of said device to be locked wherein said first end is pressure sealed whereby after said tube encircles said portion of said device to be locked, said first end is connected to said housing by a locking means and wherein said second end is secured to said sensing means whereby when said pressure in said tube decreases, said alarm is actuated by said sensing means.

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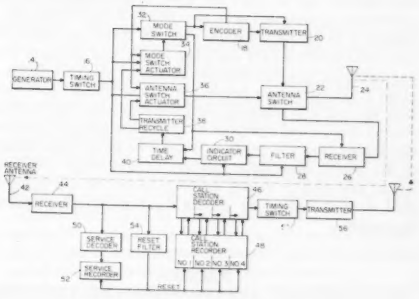
**3,866,206**

## EMERGENCY SIGNALLING SYSTEM HAVING MANUALLY OPERATED GENERATOR

**John A. DeGiorgio, Burlington; Ahmed H. Labib, and Subhash R. Rane, both of Stoneham, all of Mass., assignors to Solid State Technology, Inc., Wilmington, Mass.**

**Filed July 17, 1973, Ser. No. 379,967**
**Int. Cl. H04b *1/04***
**U.S. Cl. 340—298** **17 Claims**




1. A remote electrical signalling system comprising:
one or more call stations each including an electromechanical generator, transmitter means connected to be energized by said generator, receiver means connected to be energized by said generator, manually operable means for operating said generator for a substantial period of time, and switch means connected to direct an output from said generator to said transmitter means for an initial portion of the generator operating time for transmission of a call signal, and to said receiver means for a subsequent portion of the generator operating time for reception of a confirmation signal,
and
a home station including receiver means for reception of a call signal, and transmitter means automatically operable

in response to the reception of a call signal for transmission of a confirmation signal.

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**3,866,207**

**APPARATUS FOR DISPLAYING IMAGE INFORMATIONS**

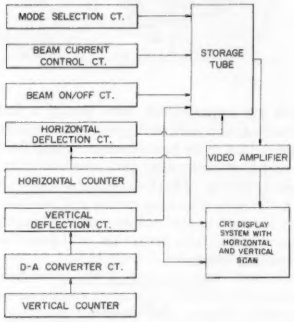
**Eiichi Goto, Fujisawa; Hajime Ohiwa, Tokyo; Kansei Iwata, Tokyo, and Tadao Urano, Tokyo, all of Japan, assignors to Rikagaku Kenkyusho, Saitama-ken and Iwatsu Electric Co., Ltd., Tokyo, both of, Japan**

**Filed Nov. 24, 1972, Ser. No. 308,947**

**Claims priority, application Japan, Nov. 24, 1971, 46-94348**

**Int. Cl. G06f** *3/14*

**U.S. Cl. 340—324 AD** **6 Claims**




**1.** Apparatus for displaying image information comprising a memory device to write-in and read-out image information by addressing in terms of two coordinates; a display device utilizing a scanning beam to display image information, said memory device having an image information signal input and image information signal output, said display device having an image information signal input; circuit means coupling the output of said memory device with the input of said display device to accomodate transmission to the display device of signals representing image information read-out from the memory device; addressing means associated with said memory device and operable to effect random access to one coordinate of a given information and sequential access to the other coordinate thereof; and scanning circuit means associated with said display device and operable to effect scanning movement of the display device beam to reproduce an image corresponding to the image information content of said image information signal, said display device scanning circuit means being coupled to said addressing means for synchronized operation therewith.

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**3,866,208**

**DATA CONTROL ARRANGEMENT FOR A DYNAMIC DISPLAY SYSTEM**

**Takao Tsuiki; Yoshikazu Hatsukano, and Kosei Nomiya, all of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

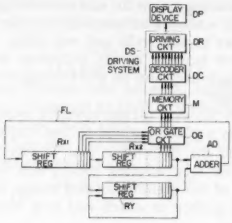
**Filed Dec. 26, 1972, Ser. No. 318,652**

**Claims priority, application Japan, Dec. 24, 1971, 46-104583**

**Int. Cl. G06f** *11/08*

**U.S. Cl. 340—324 R** **10 Claims**

**1.** A dynamic display system comprising a plurality of series connected registers having the same storage capacities, respectively, a feedback circuit which serves to feed-back the output side of the rearmost stage of said series of registers to the input side of the foremost stage of said series of registers, an OR circuit having respective inputs to which respective output signals derived from predetermined corresponding positions in each of said respective registers are supplied, and a drive circuit which drives a display device in response to the output of said OR circuit, whereby the duty cycle of a drive




signal applied to said display device is enhanced to raise the brightness of said display device.

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**3,866,209**

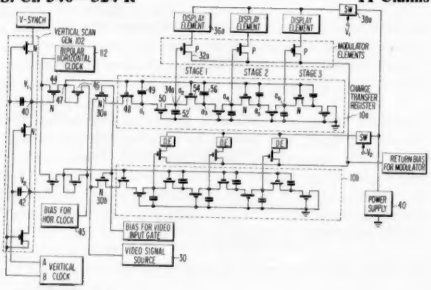
**CHARGE-TRANSFER DISPLAY SYSTEM**

**Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed June 22, 1973, Ser. No. 372,650**

**Int. Cl. G08b** *5/36*

**U.S. Cl. 340—324 R** **11 Claims**




**1.** In combination:

a multiple-stage, charge-transfer analog signal shift register having an input terminal;

means coupled to said terminal for supplying analog signals thereto;

a plurality of analog signal display elements equal to the number of stages in said charge transfer register;

a plurality of modulator elements, also equal in number to the number of charge transfer stages, each modulator element connected to a different charge transfer stage and each controlled by the charge stored in that charge transfer stage; and

means for supplying power to each display element through its modulator element.

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**3,866,210**

**X-Y ALPHANUMERIC CHARACTER GENERATOR FOR OSCILLOSCOPES**

**Donald C. Lokerson, New Carrollton, and Ronald E. Boston, Baltimore, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

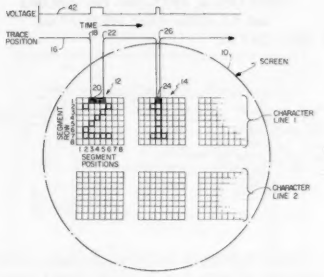
**Filed Sept. 14, 1973, Ser. No. 397,477**

**Int. Cl. G06f** *3/14*

**U.S. Cl. 340—324 AD** **5 Claims**

**1.** An alphanumeric character generator for generating characters on the screen of a general purpose oscilloscope of the type having an external horizontal sweep trigger input and a vertical deflection input, said character generator comprising: means for generating a vertical clamping voltage of a value to vertically bias the oscilloscope trace in an off-screen

position; means for generating a vertical deflection voltage of a value to vertically position the oscilloscope trace at a level on-screen corresponding to a desired level of a horizontal row of segments of characters to be generated; means for sequentially generating a plurality of control signals, each representative of a different character segment of a plurality of segments to be successively displayed in predetermined segment positions along a horizontal row on the oscilloscope screen during




a horizontal sweep of the oscilloscope trace; and gate means coupled to each said generating means responsive to each control signal for selectively and successively presenting to the vertical deflection input of the oscilloscope either said vertical clamping voltage or said vertical deflection voltage; whereby character segments are displayed by successively moving the oscilloscope trace between the off-screen vertical position and the on-screen vertical position during a horizontal sweep of the oscilloscope trace.

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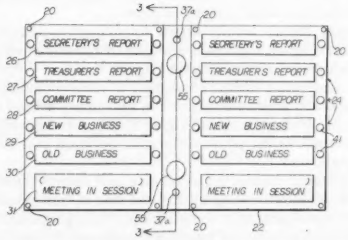
**3,866,211**

## PARLIMENTARY PROCEDURE SIGN

**Milton E. Curtis, 58 Myrtle St., Ashland, Mass. 01760**

**Filed Sept. 5, 1973, Ser. No. 394,504**
**Int. Cl. G08b** *5/36*
**U.S. Cl. 340—332** **15 Claims**




1. A lectern comprising:

enclosure means defining a platform for accommodating reading material to be read by a speaker occupying a position on one side of said enclosure means;

a panel comprising a plurality of electrically operated, individually controlled illuminated display signs, said panel mounted on an opposite side of said enclosure means so as to be readily visible to an audience facing the speaker, said signs are indicative of events contemporaneously transpiring; and

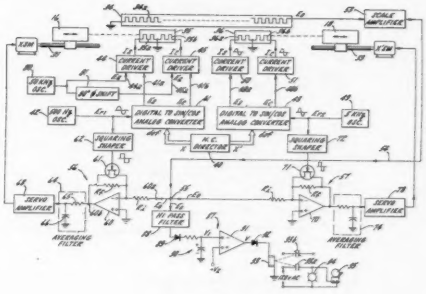
switch control means for controlling said signs, said control means being disposed on said platform so as to be readily operated by the speaker.

**3,866,212**

## POSITION CONTROL SYSTEM WITH PLURAL SIGNAL TRANSMISSION THROUGH COMMON INDUCTIVE DEVICE

**James B. Simon, and Thomas B. Bullock, both of Fond du Lac, Wis., assignors to Giddings & Lewis, Inc., Fond du Lac, Wis.**

**Filed Oct. 23, 1973, Ser. No. 408,665**
**Int. Cl. H03k** *13/02;* **G08c** *9/04*
**U.S. Cl. 340—347 DA** **7 Claims**



1. In apparatus having first and second members movable independently to different positions along a common path by drive from first and second respective motors, the combination comprising

a. a resolver type device including a first part disposed stationarily along said path and second and third parts mounted respectively on said first and second members to move along and in closely spaced relation to the first part as said members move,

b. said first part having an output winding inductively coupled to first and second input windings respectively disposed on said second and third parts,

c. means for exciting said first input windings with alternating voltage of a first predetermined frequency and which in amplitude represents the analog of a commanded position of the first member,

d. means for exciting said second input windings with alternating voltage of a second predetermined frequency and which in amplitude represents the analog of a commanded position of the second member,

e. means for exciting said first input windings with alternating voltage of a third predetermined frequency superimposed upon the voltage of said first frequency,

f. means coupled to receive the output signal induced in said output winding and responsive to the first frequency component therein for producing a first error signal indicative of the difference between the commanded and actual positions of the first member,

g. means coupled to receive the output signal induced in said output winding and responsive to the second frequency component therein for producing a second error signal indicative of the difference between the commanded and actual positions of the second member,

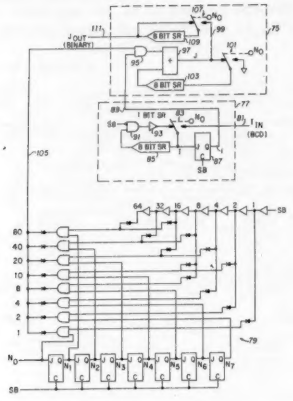
h. means coupled to receive the output signal induced in said output winding and responsive to the third frequency component therein for producing an auxiliary signal, and

i. detector apparatus coupled to receive said auxiliary signal and including means responsive to substantial reduction in the amplitude thereof for indicating a malfunction.

## 3,866,213
## SERIAL BINARY NUMBER AND BCD CONVERSION APPARATUS

Delaine C. Sather, Cedar Rapids, Iowa, and Bruce C. Lutz, Richardson, Tex., assignors to Collins Radio Company, Dallas, Tex.

Filed Sept. 10, 1973, Ser. No. 395,817
Int. Cl. H03k *13/24*
U.S. Cl. 340—347 DD 1 Claim




1. Apparatus for converting serial BCD words to serial binary words in a time frame of N words each having N bits wherein the output word is presented least significant bit first and a synchronizing bit occurs simultaneously with the most significant bit of a word comprising, in combination:

first means for generating a series of serial binary constant words each in its consecutive corresponding word in a time frame and having the respective value of 80, 40, 20, 10, 8, 4, 2, and 1;

means for supplying an input BCD word to be converted;

detection means for providing a logic one output for an entire word time corresponding to a given logic value in the input BCD word for a corresponding word time in a frame time, said detection means comprising,

first switch means for a first input connected to said means for supplying an input BCD word, a second input and an output,

first shift register means having input connected to said output of said first switch means and having an output, gating means for passing the output of said shift register means only at times other than the occurrence of said synchronizing bits,

further shift register means connected between the output of said gating means and the second input of said first switch means, and

J-K flip-flop means connected to said output of said first switch means and activated only at said synchronizing bit times;

AND gate means connected to said first means and to said detection means for passing the received constant only during those word times that a logic one is detected in the BCD number by said detection means;

summation means including first and second inputs and an output, said first input of said summing means being connected to the output of said AND gate means;

second switch means connected to said output of said summing means for providing an output from said second switch means only during N-1 word times of a frame time;

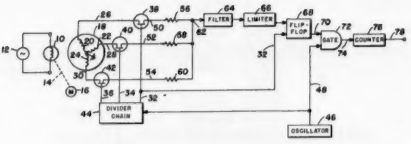
storage means connected between said output of said second switch means and said second input of said summing means for delaying data bits passed therethrough by one word time; and

apparatus output means for providing as an output converted word the word appearing at the output of said summing means at the end of each time frame.

## 3,866,214
## SYNCHRO-TO-DIGITAL CONVERTER

Sidney A. Taylor, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 5, 1973, Ser. No. 404,063
Int. Cl. G08c *9/00*; H03k *13/02*
U.S. Cl. 340—347 SY 7 Claims




1. In a system having an energized primary winding means and a plurality of secondary winding means physically displaced in phase one from another each having a signal induced thereon dependent upon the angular position of said primary winding means relative to said secondary winding means, a converter for determining said relative angular positions, comprising;

signal generator means producing an output signal of frequency greater than the frequency of said induced signals,

means connected to receive said output signal of said generator means and produce therefrom a plurality of phase-shifted output signals having a common frequency lesser than the frequency of the output signal from said signal generator means but greater than the frequency of said induced signals,

each of said plurality of phase-shifted output signals from said frequency converter means being shifted in electrical phase relative to one another by an amount equal to said physical phase displacement between associated ones of said plurality of secondary winding means,

a plurality of signal chopping means each having inputs connected to receive an induced secondary winding signal and its associated phase shifted signal and each producing an output signal therefrom,

summing means having inputs connected to receive said output signals from said plurality of chopping means for producing a summed output signal,

pulse generating means connected to receive said summed signal and a preselected one of said phase shifted signals for producing an output signal having a pulse width proportional to the phase difference between said received signals, and

gating means connected to receive said output signal from said pulse generating means and said output signal from said signal generator means for producing a pulsed signal having a number of pulses proportional to said relative angular position.

## 3,866,215
## ELECTRONIC KEYBOARD FOR TYPEWRITER

Karel Havel, P.O. Box 66, Station M, Toronto 21, Ontario, Canada

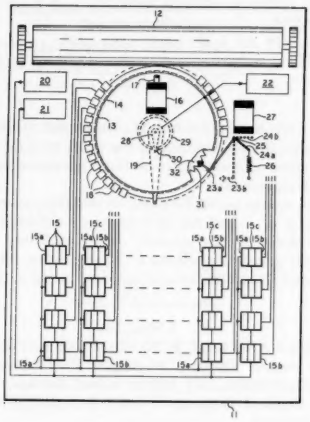
Filed Apr. 9, 1973, Ser. No. 348,937
Int. Cl. G08c *21/00*
U.S. Cl. 340—365 C 6 Claims

1. An electronic keyboard comprising:

a plurality of electronic keys adapted for being actuated, each said key comprising conductive areas adjacent a surface thereof;

means for establishing a selected electrical coupling among said conductive areas in each said key, said coupling being changeable by actuating of said keys;

a plurality of electrical switches, each said switch comprising a plurality of contacts and a wiper movable therealong, said contacts being electrically connected according to a predetermined system to said conductive areas in said keys;



electronic sensing means for detecting a change of said electrical coupling in said keys caused by actuating of said keys, inputs of said sensing means being electrically connected to said wipers of said switches, respectively; and

means to move said wipers, respectively, to gradually electrically connect said keys to inputs of said sensing means, respectively, for locating of actuated keys.

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**3,866,216**

## INDICATOR SYSTEM WITH SIGNAL INDICATORS

**Otto Tschumi, Solothurn, Switzerland, assignor to Autophon Aktiengesellschaft, Solothurn, Switzerland**

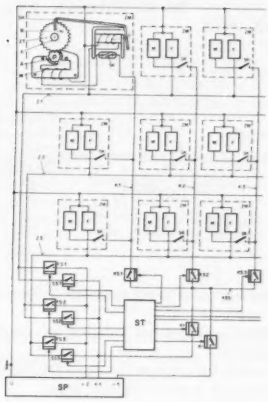
**Filed Oct. 10, 1973, Ser. No. 405,146**

**Claims priority, application Switzerland, Oct. 16, 1972, 15045/70**

**Int. Cl. G08b** *5/00*

**U.S. Cl. 340—379** **10 Claims**

1. An indicator system comprising a plurality of interchangeable signal indicators each being placed in respective rows and columns and having a stepping motor with two conductors and a rotatable signal carrier mechanically driven by said stepping motor, and a mechanical stop for stopping said signal carrier in a defined position, and a release magnet for releasing said mechanical stop, a power supply for providing a common potential to one of the conductors of each stepping motor and to said release magnet and a predetermined voltage potential to a plurality of column conductors to which the other conductor of all signal indicators of the respective column can be connected, said power supply further adapted to supply a predetermined voltage potential to one side of each said release magnet of a selected row, a stepping motor switch means connecting each respective stepping motor to its respective column conductor, and a column control switch means interconnecting said power supply means to each respective column conductor, said stepping motor switch means being disposed within each signal indicator and being



adapted for actuation in response to certain energization of said release magnet.

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**3,866,217**

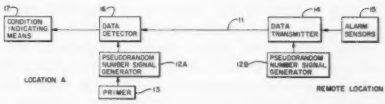
## MONITORING TRANSMISSION LINK BY COMPARING PSEUDORANDOM SIGNALS

**Victor A. Bennett, Jr., Gloucester, Mass., assignor to Currier-Smith Corporation, Bedford, Mass.**

**Filed Dec. 26, 1972, Ser. No. 318,419**

**Int. Cl. G08b** *23/00*

**U.S. Cl. 340—416** **10 Claims**




1. A method of monitoring a communication link to detect a change from a normal to an abnormal condition in said communication link which method includes the steps of,

establishing the same initial conditions in like first and second pseudorandom signal generating means at a first location to provide first and second like pseudorandom signals respectively occurring at substantially the same time,

transporting said second pseudorandom signal generating means to a second location,

transmitting said second pseudorandom signal over said communication link between said second location and said first location,

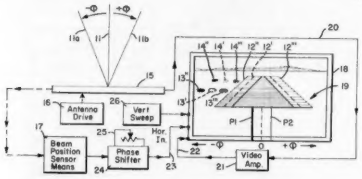
comparing the transmitted second pseudorandom output signal with said first pseudorandom output signal at said first location,

and providing an indication when the latter signals differ for more than a predetermined time interval.

## 3,866,218
## SCANNING RADAR AZIMUTH POSITION CONTROL SYSTEM

David W. Young, N. Hollywood, Calif., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Aug. 16, 1973, Ser. No. 388,748
Int. Cl. G01s 7/20
U.S. Cl. 343—5 LS 2 Claims




1. A scanning radar azimuth position control system comprising, in combination:

a. a scanning radar system including an antenna for generating a beam;

b. an antenna drive means for sweeping said beam back and forth through a given azimuth angle;

c. a beam position sensor means responsive to the azimuth angle of said beam to provide a cyclic output signal which oscillates in time at the same frequency as the beam oscillates back and forth in azimuth through said azimuth angle;

d. a radar cathode ray tube including a display screen and having a video input for receiving echo signals from said antenna and an horizontal input for receiving said cyclic signal so that said echo signals are displayed as images in first and second horizontal positions respectively generated when the beam is swept through said azimuth angle in one direction and swept back through said azimuth angle in an opposite direction as represented by said cyclic signal; and

e. phase shift means connected between the output of said beam position sensor means and said horizontal input to enable shifting of the phase of said cyclic signal, said phase shift means including adjusting means for controlling the degree of phase shift of said cyclic signal, whereby the image of said first horizontal position of echo signals displayed on said display screen can be repositioned relative to the image of said second horizontal position by said adjusting means to shift the phase of the cyclic wave form passed to said horizontal input an amount to correct any phase shift between the output of said beam position sensor means and the actual azimuth position of said beam as a consequence of errors occurring in conversion by said beam position sensor means of the actual position of the beam and the generation of the cyclic wave form representing said actual position to thereby cause said first and second horizontal positions to coincide and thereby avoid double images.

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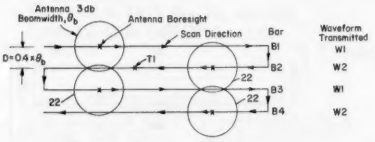
## 3,866,219
## RADAR SYSTEM WITH TARGET ILLUMINATION BY DIFFERENT WAVEFORMS

David A. Kramer, Canoga Park, and George P. Lavas, Torrance, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 5, 1973, Ser. No. 376,858
Int. Cl. G01s 9/02, 7/28
U.S. Cl. 343—5 R 5 Claims

1. In a radar system of the type including an antenna movable in a multiple-bar scan pattern, transmitting means for directing signals to said antenna which are transmitted thereby, receiving means including signal processor means coupled to said antenna for receiving and processing signals received by said antenna, an arrangement comprising:

means for controlling said antenna to move in a scan pattern of a sequence of bars at different elevations, defining odd and even bars, said antenna being selected to be characterized by an elevation beamwidth definable as $\theta_b$ and the elevation spacing between adjacent bars is $n \times \theta_b$ where $n$ is less than 0.5;




control means coupled to said antenna and to said transmitting means for controlling the latter to direct signals of different characteristics during successive bars of said scan pattern; and

control means controlling said transmitting means to direct signals of a first set of properties, definable as a first waveform, to said antenna during each odd bar and to direct signals of a second set of properties, definable as a second waveform, to said antenna during each even bar.

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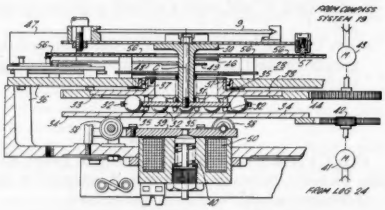
## 3,866,220
## RADAR AND LIKE ECHO-DISPLAY APPARATUS

Clifford Arthur Embling, Buckhurst Hill; Alban Harrison, Woodford Green, and Arthur Alfred Hawkes, Brentwood, all of England, assignors to Smith Industries Limited, Londoa, England

Filed June 26, 1973, Ser. No. 373,701
Claims priority, application Great Britain, June 26, 1972, 29770/72
Int. Cl. G01s 7/04
U.S. Cl. 343—5 ST 12 Claims



9. Radar apparatus for use on a moving craft, comprising means for receiving echoes from objects within a region of radar surveillance, display means for providing a plan-position display of the received echoes, an image-retaining device having a light-emitting surface, said image-retaining device being operable electrically to retain images of light patterns to which it is exposed and to emit light from said surface with a distribution thereacross in accordance with the retained images, and further means mounting the image-retaining device for exposure to the display means to retain cumulatively and thereby display from said surface superimposed images of the plan-position display, said further means comprising a base structure, a pair of parallel plate members spaced from one another, a caged ring of balls sandwiched between said plate members, means mounting a first of said plate members for translation along a straight line relative to both the second plate member and said base structure, means mounting the second plate member for angular displacement relative to said base structure, a table mounted centrally with respect to said caged ring of balls for carrying said image-retaining device,

first motor means for driving said first plate member along said straight line relative to said base structure in accordance with craft movement, and second motor means for displacing said second plate member angularly relative to said base structure in accordance with change in direction of the craft movement.

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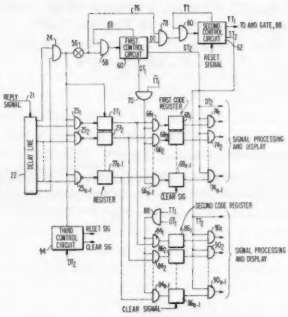
## 3,866,221
## BEACON DECODER SYSTEM

Mitsuo Hikosaka, 1590-18 Kokura, Kasuga, Japan

Filed Sept. 17, 1973, Ser. No. 397,950
Int. Cl. G01s 9/56
Claim priority, application Japan, Sept. 18, 1972, 47-95010
U.S. Cl. 343—6.5 LC 20 Claims



1. A decoder system for use in a communication system of the character in which the format of a signal is comprised of a first and second framing pulses spaced in time by a fixed interval, said signal format additionally containing a plurality of data bits represented by the presence and absence of pulses, each occurring during a corresponding time slot of a sequence of such time slots defined between said first and second framing pulses, said decoder system being useful in discriminating between signals occurring in near time coincidence and comprising:

converter means for converting said signals from serial to parallel form, said converter means having a plurality of output taps each associated with one of said data bits provided between said framing pulses;

coincidence means, connected to said converter means to detect the coincidence of the first and second framing pulses of each signal and connected to produce a coincidence signal when such coincidence is detected;

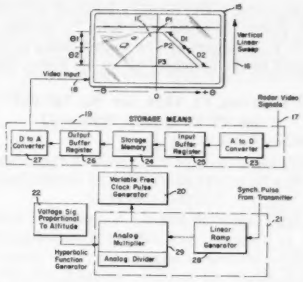
a plurality of gating means, each connected to one of said converter means output taps, said gating means being responsive to said coincidence signal to read out said data pulses from said converter means; and

memory means comprising a plurality of data bins each for storing one of said data bits, said memory means including comparator means for comparing the width of each data pulse with that of its associated coincidence signal to accept or reject said data pulse dependent upon whether it has a width equal to that of said coincidence signal.

## 3,866,222
## PERSPECTIVE RADAR DISPLAY USING LINEAR VERTICAL SWEEP

David W. Young, 627 N. Beachwood Dr., No. Hollywood, Calif. 91506

Filed Aug. 27, 1973, Ser. No. 391,561
Int. Cl. G01s 7/20
U.S. Cl. 343—5 LS 7 Claims



5. An apparatus according to claim 4, in which the vertical sweep for displaying the video signals is linear and said given function is a hyperbolic function.

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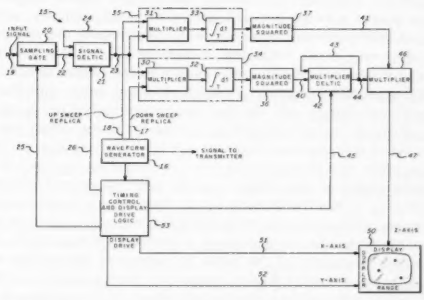
## 3,866,223
## MULTIPLICATIVE SIGNAL PROCESSOR FOR TARGET DETECTION SYSTEMS WITH SEQUENTIAL DOPPLER SEARCH

Arthur W. Crooke, Concord, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 1, 1972, Ser. No. 224,369
Int. Cl. G01s 7/28, 9/02
U.S. Cl. 343—17.2 PC 7 Claims



1. In a system for detecting targets by transmitting a composite signal having first and second components and processing the composite signals reflected from said targets, the combination comprising

input terminal means responsive to said reflected composite signals,

first matched filter means having an input coupled to said input terminal means and matched to said first component of said reflected composite signals and having an output for providing first signals,

second matched filter means having an input coupled to said input terminal means and matched to said second component of said reflected composite signals and having an output for providing second signals,

time compression means having an input coupled to said output of said first matched filter means for storing said first signals occurring during a predetermined time interval,

said time compression means having an output, and

multiplier means having first and second inputs coupled to said output of said time compression means and to said output of said second matched filter means respectively and having an output for providing the product of said stored first signals and said second signals.

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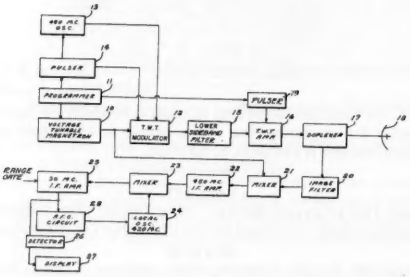
**3,866,224**

**FREQUENCY DIVERSITY RADAR SYSTEM**

**William T. Porter, Newfield, and John D. Pfeiffer, Norwich, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Oct. 13, 1958, Ser. No. 767,067**
**Int. Cl. G01s** *7/28, 7/36, 9/02*
**U.S. Cl. 343—17.2 R** **3 Claims**




**1.** An anti-jamming radar system, comprising; a voltage tunable magnetron, means for controlling the output frequency of said voltage tunable magnetron, a low frequency oscillator, means for modulating said voltage tunable magnetron output with the output frequency of said oscillator, said last-named means including means for suppressing the voltage tunable magnetron frequency, means for pulsing said modulating means to add pulse information to the output signal of said modulating means, a travelling wave tube amplifier, means for passing only the first lower sideband of the modulated signal to said amplifier, means for transmitting said amplified signal toward a target and for receiving the return signal from the target, a mixer circuit, means for applying the return signal to said mixer circuit, said last-named means including means for filtering out all frequencies in the image frequency band, means for applying the output of said voltage tunable magnetron to said mixer to thereby produce an intermediate frequency of the same frequency as said oscillator frequency, a display device, means for recovering the pulse information from said return signal and means for applying the pulse information to said display device.

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**3,866,225**

**PARAMAGNETIC SAMPLE ARRANGEMENT FOR ECM FALSE ECHO GENERATION**

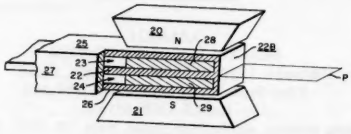
**Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 4, 1973, Ser. No. 366,914**
**Int. Cl. H04k** *3/00;* **G01r** *33/08;* **H03h** *7/30*
**U.S. Cl. 343—18 E** **10 Claims**

**1.** An apparatus for providing spin echo delay lines for microwave signal pulses, said apparatus being characterized by two paramagnetic samples at opposite sides of a plane of symmetry passing through a magnetic field, said apparatus comprising:

pole pieces having uniformly-spaced pole faces forming a magnetic field having a plane of symmetry passing along the space between the pole faces,

means defining two separate and superimposed waveguide chambers such that one waveguide chamber overlies the other in the space between said pole pieces, said waveguide chambers being arranged to define a wall extending between them along said plane of symmetry of the magnetic field between said pole pieces, and




paramagnetic means disposed in each waveguide chamber in a position such that with respect to said plane of symmetry the magnetic field between said pole pieces is symmetrically applied to each paramagnetic means.

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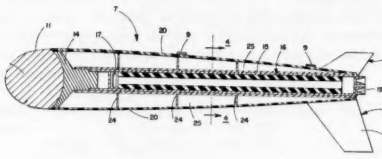
**3,866,226**

**RADAR-AUGMENTED SUB-TARGET**

**Chris Benneche, Newbury Park; Brochu James W., Granada Hills, and Jack S. Conner, Topanga, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.**

**Filed Feb. 25, 1974, Ser. No. 445,153**
**Int. Cl. H01q** *15/14*
**U.S. Cl. 343—18 B** **12 Claims**



**12.** Target means comprising:

a. a drone aircraft remotely controlled;

b. a plurality of streamlined powered flying targets carried by said drone until ready to be launched;

c. radar reflection augmenting means in each said target;

d. drive motor in each said target being individually startable during drone flight for launching said targets individually from said drone; and

e. removable cover means forming a radar mask effectively surrounding the reflection augmenting means in each of said targets except one, and individual control means operatively connected respectively to said cover means to separate the latter from its respective target in response to actuation of its said control means.

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**3,866,227**

**DOPPLER TRACKER RECEIVER**

**Abraham Eli Ruvin, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 15, 1973, Ser. No. 341,779**
**Int. Cl. G01s** *1/38*
**U.S. Cl. 343—106 D** **8 Claims**

**1.** A doppler tracker receiver for receiving a doppler signal which at the end of each one of successively-occurring intervals exhibits a momentary phase discontinuity, said receiver comprising:

a. a voltage-controlled oscillator for producing a controlled frequency,

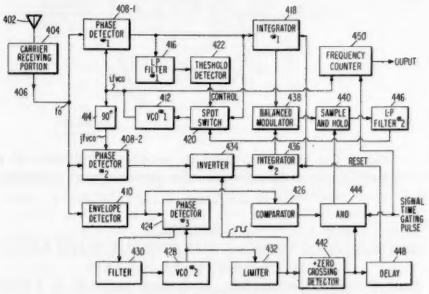
b. phase detection means coupled to said oscillator and responsive to said doppler signal applied thereto for deriving first and second outputs manifesting respectively the difference in phase between each of first and second

phase-quadrature components of said controlled frequency and said signal,

c. phase-discontinuity detection means responsive to said signal applied thereto for determining the end and middle of each successively-occurring interval to thereby divide each interval into two halves,

d. a first integrator and first coupling means applying said first output of said phase detection means as an input to said first integrator,

e. a second integrator and second coupling means controlled by the output of said phase-discontinuity detection means for applying the second output of said phase detection means with inversion as an input to said second




PARALLEL-PHASE DOPPLER TRACKER RECEIVER 400

integrator during one half of each interval and without inversion during the other half of each interval,

f. signal translating means including a sample and hold circuit controlled by the output from said phase discontinuity detection means for sampling the algebraic product of the outputs from said first and second integrators at the end of each interval and immediately thereafter resetting said first and second integrators, and

g. third coupling means between said sample and hold circuit and said voltage control oscillator to apply an error signal to said oscillator determined by the algebraic amplitude of the held sample signal from said sample and hold circuit.

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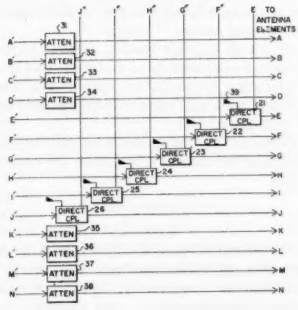
## 3,866,228
## TWO FREQUENCY LOCALIZER GUIDANCE SYSTEM

**Andrew Alford, 71 Bacon St., Winchester, Mass. 01840**

**Filed Mar. 23, 1973, Ser. No. 344,358**
**Int. Cl. G01s *1/14***
**U.S. Cl. 343—109** **13 Claims**




1. In a localizer signalling system for guiding an aircraft along a course, means producing radiation patterns of first and second different frequencies which define the course comprising,

sources of first and second different frequency signals,

an array of at least N radiating elements,

means energized by the source of the first frequency for feeding first frequency power along N feed lines,

means energized by the source of the second frequency for feeding second frequency power along n feed lines, and means coupling power from said N feed lines and said n feed lines to the N radiating elements, said coupling means including *n* means, each fed by one of said N lines and one of said n lines and each feeding unequal first and second frequency power to a different radiating element, whereby the radiation patterns of different frequencies for the localizer signalling system are radiated by the N elements.

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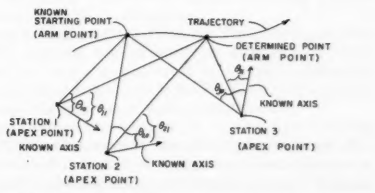
## 3,866,229
## METHOD AND APPARATUS FOR AUTOMATICALLY DETERMINING POSITION-MOTION STATE OF A MOVING OBJECT

**Calvin Miles Hammack, P. O. 304, Saratoga, Calif. 95070**

**Continuation-in-part of Ser. No. 817,765, April 21, 1969, Pat. No. 3,691,560, which is a division of Ser. Nos. 420,623, Dec. 23, 1964, Pat. No. 3,445,847, and Ser. No. 86,770, Feb. 2, 1961, Pat. No. 3,706,096 and Ser. No. 74,180, Sept. 21, 1970, Pat. No. 3,795,911, which is a continuation-in-part of Ser. No. 278,191, May 6, 1963, abandoned. This application Sept. 12, 1972, Ser. No. 288,429**

**Int. Cl. G01s *5/04***
**U.S. Cl. 343—112 R** **104 Claims**




1. A method of determining at least one otherwise unknown dimension of the position-motion state of at least one selected point of a plurality of points in space relative to the position of at least one other of said plurality of points;

said plurality of points being divided into two groups of points, each group of points comprising at least one point of said plurality of points;

each point of the first group of points, hereinafter called an apex point, being the apex of at least one angle;

each point of the second group of points, hereinafter called an arm point, being contained in one arm of at least one of said angles and being a point along the trajectory of a moving object;

at least one dimension of the position-motion state of at least one of said second group of points being known a priori;

said method comprising the following elements:

Element 1. Determining relative to a particular one of said apex points angular data related to said particular apex point and at least one said arm point, said angular data being dependent upon the variation of direction of said moving object relative to said apex point which variation is resultant of the motion of said moving object at said last mentioned arm point,

Element 2. Performing a plurality of determinations as described in Element 1 such that at least one dimension of the position-motion state of at least one selected point of said plurality of points becomes physically defined relative to the position-motion state of other of said plurality of points by the values of said plurality of determinations, by the known parameters related to

said determinations, and by at least one said dimension which one said dimension is at least bounded by a priori data,

Element 3. Computing at least one dimension of the position-motion state of at least one selected point of said plurality of points using the information obtained in Element 1 and Element 2 and at least one said dimension known a priori.

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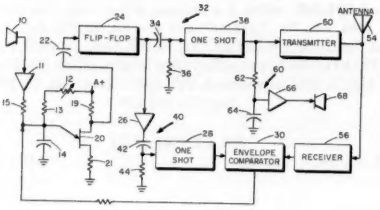
**3,866,230**

## SINGLE CHANNEL COMMUNICATION SYSTEM

**John M. Tewksbury, Baltimore, Md., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Mar. 2, 1973, Ser. No. 337,520**
**Int. Cl. H04b *1/40***
**U.S. Cl. 343—178** **3 Claims**




1. A station adapted for use in a common channel communication system, said system including at least one remote means for transmitting modulated pulses, said station comprising:

means for receiving the pulses from said remote means;

means responsive to the received pulses for generating individual pulses of a pulse train in the interval between received pulses and for modulating the pulse train to include the modulation of the received pulses;

means for transmitting the modulated pulse train; wherein said means for generating and for modulating includes;

a timing network of the relaxation type for generating the individual pulses in said pulse train; and,

means for continuously altering the time constant of said network in response to at least the received pulses.

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**3,866,231**

## SATELLITE TRANSMITTER OF ULF ELECTROMAGNETIC WAVES

**Francis J. Kelly, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 8, 1972, Ser. No. 285,896**
**Int. Cl. H01q *1/28***
**U.S. Cl. 343—705** **2 Claims**

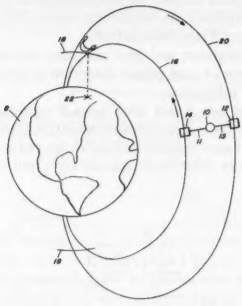
1. A method of creating a gigantic loop antenna in the earth's magnetosphere comprising:

orbiting a satellite

extending long insulated conductors with exposed ends therefrom;

coupling an ELF or ULF signal through said long conductors to the earth's magnetic field;

whereby the signal flows through one conductor down along the earth's magnetic field into the ionosphere and back



along the magnetic field to another conductor of said satellite so as to complete the gigantic loop antenna.

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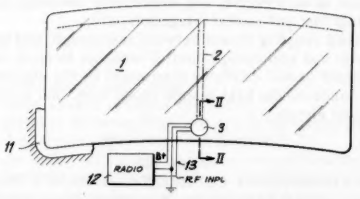
**3,866,232**

## AUTOMOTIVE-VEHICLE WINDSHIELD WITH BUILT-IN ACTIVE-ANTENNA SYSTEM

**Paul Weigt, Gelsenkirchen, Germany, assignor to Flachglas Aktiengesellschaft Delog-Detag, Gelsenkirchen, Germany**

**Filed Dec. 5, 1973, Ser. No. 422,102**
**Claims priority, application Germany, Dec. 9, 1972, 7245210**
**Int. Cl. H01q *1/32***
**U.S. Cl. 343—713** **10 Claims**




1. In a motor vehicle having a radio the improvement comprising the combination of:

a window glass formed with a recess;

an antenna element bonded to said window glass and having an end at said recess;

an active-circuit capsule having active electronic circuit components connectable to said radio and having at least one formation resiliently engageable and form-fitting in said recess with said capsule lying on said window glass over said recess; and

means between said components of said capsule and said end of said antenna in said recess for connecting same together.

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**3,866,233**

## DISH ANTENNA HAVING SWITCHABLE BEAMWIDTH

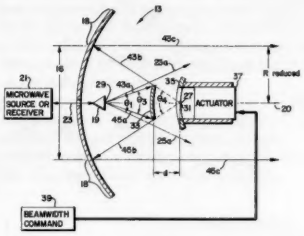
**Richard F. Schmidt, Seabrook, Md., assignor to The United States of America as represented by the National Aeronautic and Space Administration**

**Filed Sept. 10, 1973, Ser. No. 395,868**
**Int. Cl. H01q *19/14***
**U.S. Cl. 343—761** **7 Claims**

1. A switchable beamwidth antenna having a wide beamwidth state and a narrow beamwidth state at a single predeter-

mined frequency, said beamwith state being responsive to a beamwidth selection command source comprising:

a main reflecting dish having a boresight axis and a direction of view along said axis, wherein said dish may be divided with an imaginary contour coaxial with the boresight axis into a central portion and an outer portion bordering the central portion; and




single frequency means responsive to the beamwidth selection command source, exciting substantially only the central portion of the main dish in the wide beamwidth state, and for exciting both the central and outer portions of the main dish in the narrow beamwidth state, said exciting means including a reducible subreflector defining in the reduced state a truncated subreflector for exciting only the central portion of the main dish so as to achieve the wide beamwidth state.

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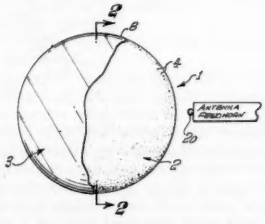
**3,866,234**

**SHAPED CERAMIC DIELECTRIC ANTENNA LENS**

**Louis E. Gates, Jr., Westlake Village; William E. Lent, Los Angeles, and Jose A. Flores, Venice, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 26, 1973, Ser. No. 428,589**
**Int. Cl. H01q** *15/08*
**U.S. Cl. 343—911 R** **5 Claims**



1. A temperature-resistant dielectric lens for transmitting a particular band of electromagnetic energy comprising:

a shaped lens body formed of a quantity of porous prefired sealable ceramic granules fusably bonded one to the other for providing a shaped lens body of sufficient structural rigidity and strength to permit the formation of operatively self-sustaining shapes at thicknesses up to and exceeding 6 inches,

each of the granules being substantially uniform in composition and size with said granule size and uniformity closely controlled to permit the formation of a lens body in which the fused granules have an intergranular and an intragranular pore size no larger than the minimum wavelength of said energy band,

said pore size along with the granule size and composition being adjustably variable to provide a particular intragranular and intergranular porosity and a uniform dielectric constant whereby transmission efficiency of the energy band through said lens body can be maximized and distortion reduced.

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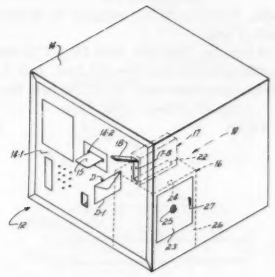
**3,866,235**

**DEPOSITORY FOR IMPRINTING AND STORING ENVELOPES CONTAINING PAPER CURRENCY AND/OR COINS**

**Robert W. Maynard, Cincinnati, and Kenneth W. Alexander, Westchester, both of Ohio, assignors to The Mosler Safe Company, Hamilton, Ohio**

**Filed May 10, 1973, Ser. No. 359,116**
**Int. Cl. E05g**
**U.S. Cl. 346—22** **2 Claims**



1. A depository for receiving and storing items having a generally flat shape with a flat imprint receiving surface thereon comprising, in combination:

a vault for storing received items, said vault having an item transfer opening through which an item can be transferred for storage in said vault, said vault including an access opening with a door to facilitate selective access to said vault for removal of items stored therein;

a housing disposed above said vault, said housing including spaced generally vertically disposed side walls, a top wall, a rear wall and a bottom opening communicating directly with said transfer opening, said transfer opening being at least as large as said bottom opening;

said housing having a manually accessible insertion opening selectably closable with a manually accessible housing door disposed at the opposite end of said housing from said rear wall;

said housing having a generally horizontally slidable trap door mounted for movement between a blocked and an open position, said trap door comprising a floor for said housing when disposed at its blocked position to prevent access through said transfer opening to said vault and permitting items to freely fall from said housing through said bottom opening and said transfer opening directly into said vault when said trap door is disposed at its open position;

said side walls, said top wall, said rear wall, and said trap door at its blocked position collectively comprising a receptacle for receiving flat items manually inserted directly into said receptacle through said insertion opening and temporarily storing said flat items in a generally vertical position with the flat surfaces of the item disposed generally parallel to said side walls;

item detector means disposed within said item receptacle to detect the presence of an item said item receptacle, said item detector producing an item present signal when an item is detected within said item receptacle;

a door closed detector for detecting when said housing door is closed and producing a door closed signal;

control means responsive to said door closed signal and said item present signal to sequentially generate a lock door signal, a printer actuate signal, and an open trap door signal;

a selectably operable door lock operative in response to said lock door signal to lock said housing door to prevent access to said housing;

a printer disposed proximate one said side wall for imprinting one said flat surface of an item in said receptacle, said printer being actuated by receipt of said printer actuate signal, said printer being disposed at a point above said trap door; and

a trap door actuator operable in response to said open trap door signal to slide said trap door from its blocked to its open position and then back to its blocked position.

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**3,866,236**

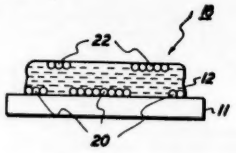
## IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION

**William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 254,999, May 19, 1972, abandoned, which is a continuation of Ser. No. 54,264, July 13, 1970, abandoned. This application Apr. 22, 1974, Ser. No. 462,694**

**Int. Cl. H04n** *5/76, 3/16*

**U.S. Cl. 346—74 ES** **12 Claims**




1. An imaging method comprising the steps of:

(a) providing an imaging member comprising a substantially electrically insulating liquid layer containing non-photosensitive migration material, on a substrate;

(b) then applying a uniform electrical imagewise migration force other than by a technique wherein an essential step is imagewise exposure to activating electromagnetic radiation, to said migration material whereby said migration material migrates without material lateral migration, in depth an imagewise configuration to said substrate leaving portions of said insulating liquid layer above areas of migration substantially devoid of migration material everywhere said uniform electrical imagewise migration force was applied.

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**3,866,237**

## DIGITAL PHASE CONTROL FOR INK JET PRINTER

**Johann Hans Meier, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 22, 1973, Ser. No. 372,897**

**Int. Cl. G01d** *18/00*

**U.S. Cl. 346—75** **12 Claims**

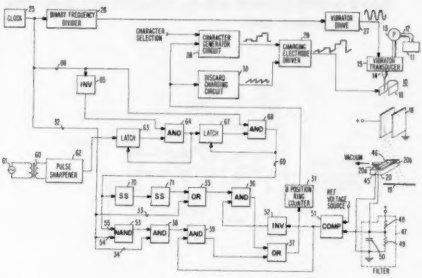
1. In an ink jet printer having a transducer for vibrating a nozzle at a predetermined frequency to produce droplets having a selected phase relation with applied, variable, input information charges induced thereon by an input information source energizing a charging electrode for correspondingly varying deflection of said droplets in an electric field between deflecting electrodes, apparatus for varying the phase relation between said transducer vibrations and said applied charges comprising:

circuit means connected to said charging electrode for applying, in response to an initiation signal, input information signals to said droplets and, in the absence thereof, applying calibration signals to droplets to be discarded;

means providing a train of clock pulses of fixed frequency;

frequency dividing means connected to said clock pulse means for energizing said transducer means at said predetermined frequency;

counter means of predetermined capacity connected to said clock pulse means and said circuit means for cyclically counting said pulses and producing an initiation signal during each counting cycle at said predetermined frequency;




detecting means for said discarded droplets having a plurality of sensor locations, each said location producing an output signal peculiar to droplet presence thereon; and

control means responsive to said output signals to alter the number in said train of clock pulses at said counter means during a counting cycle and change the time of said count cycle and thereby the frequency of said initiation signal.

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**3,866,238**

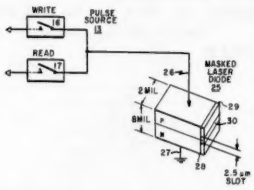
## LASER DIODE FOR USE WITH FILM MEMORY SYSTEM

**Marvin E. Monroe, Columbus, Ohio, assignor to North Electric Company, Galion, Ohio**

**Filed June 1, 1973, Ser. No. 366,180**

**Int. Cl. G11b** *7/00*

**U.S. Cl. 346—76 L** **6 Claims**




1. In a memory system using film for the storage of information, the improvement comprising a laser having a light output face, a mask disposed over said light output face including a light emitting area having at least one dimension which is formed in the mask by the beam output from said laser in the stimulated light mode, said mask being of a material which is opaque to the wavelength of light output from said laser and which is displaceable by the beam output of the laser in the stimulated light mode, whereby an emitted light beam of substantially the same dimension is provided in both the spontaneous and stimulated light modes of the laser.

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**3,866,239**

## AUTOMATIC TYPE-POSITIONING DEVICE IN PHOTOCOMPOSER

**Yasushiro Semi, 5-10-25 Zaimokuza Kamakra, Kanagawaken, and Kenzo Ogawa, 7-403, 1, Sakurazutsumi 1, Chrome, Tokyo, both of Japan**

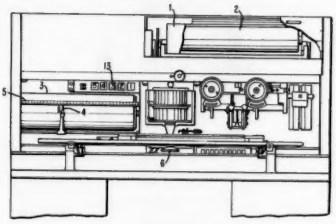
**Filed June 27, 1973, Ser. No. 374,240**

**Int. Cl. B41b** *21/36*

**U.S. Cl. 354—8** **5 Claims**

1. In combination with a photocomposing machine comprising:

a. a dark box which is arranged to move axially,
b. a rotatable cylinder mounted for rotation within said dark box and a photosensitive material mounted thereon,
c. a recording cylinder which is adapted to be moved with respect to axial and rotary movement of said rotatable cylinder, and
d. lens and shutter means for transmitting an image of predetermined figure or symbol in a dial plate,
e. an automatic type-positioning device including:
i. first magnetic head means mounted on said dark box so as to move said head means with said box,
ii. a first reference scale of magnetic material arranged to store a pulse of said first magnetic head means,
iii. a digital counter means,
iv. first circuit means for transmitting a signal which is representative of an axial position of said rotatable cylinder to said digital counter means,
v. second magnetic head means movable in proportion to the rotation of said rotatable cylinder,



vi. a second reference scale of magnetic material arranged to store a pulse of said second magnetic head means,
vii. second circuit means for transmitting a signal which is representative of rotation of said rotatable cylinder to said digital counter means,
viii. automatic switching means for switching the connection of said first or second circuit means with said digital counter means in accordance with the operation of said rotatable cylinder,
ix. first memory means for storing the axial movement of said rotatable cylinder,
x. second memory means for storing the rotation of said rotatable cylinder,
xi. first reading head means for reading out the stored information from said first memory means,
xii. second reading head means for reading out the stored information from said second memory means,
xiii. means for selectively gating output pulses of said first and second reading head means, and
xiv. means for operating said shutter means in response to said output pulses.

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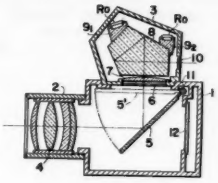
**3,866,240**

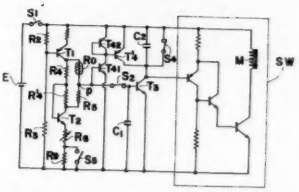
## PHOTOGRAPHIC CAMERA HAVING A PHOTOSENSITIVE ELEMENT FOR MEASURING THE LIGHT RAYS THROUGH THE OBJECTIVE LENS

**Kayoshi Tsujimoto, Osaka, Japan, assignor to Minolta Camera Co., Ltd., Osaka-fu, Japan**

**Filed Aug. 6, 1971, Ser. No. 169,637**
**Claims priority, application Japan, Aug. 12, 1970, 45-70531**
**Int. Cl. G03b 7/08; G01j 1/44**
**U.S. Cl. 354—24** **8 Claims**

**1.** An automatic exposure control device for a photographic camera of the type having a photosensitive element mounted behind a focusing plate to receive light from a scene to be photographed through an objective lens, comprising:
a light measuring circuit for generating an output signal as a function of the light intensity incident on said photosensitive element;
means for storing said output signal;
means for separating said means for storing from said light measuring circuit at least during the time period when said photosensitive element is blocked from said scene light;
means for generating current in response to said stored output signal;
means controlled by said current for timing shutter closing;
a correction circuit responsive to said output signals for generating a current in accordance with the intensity of light incident on said photosensitive element unrelated to scene light to correct said means for timing; biasing





means for additionally correcting said output signal in accordance with the unblocking or blocking of saiid photosensitive element; and
switching means for actuating said biasing means only during the blocking of said photosensitive element from scene light.

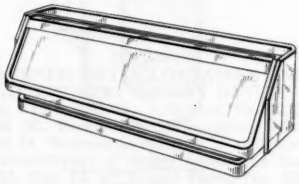
**8.** In a single lens reflex camera including a mirror movable between a viewing position and a photographing position and a photosensitive element receiving light from a scene to be photographed through an objective lens and illuminated with stray light from an eyepiece with said mirror in said viewing position and blocked from said scene light with said mirror in photographic position, an automatic exposure control device comprising:
first means including said photosensitive element for generating a first voltage varying proportional to the logarithm of the scene brightness;
second means for generating a second voltage representative of diaphragm aperture and film sensitivity settings;
means for generating an output voltage proportional to the logarithm of exposure time said first and second voltage;
means for storing said output voltage;
means for separating said means for storing from said means for generating at least during the period when said mirror is in transition between said viewing position and said photographing position;
means responsive to said stored voltage for generating current proportional to the anti-logarithm of said stored voltage;
an integrating capacitor charged by said current;
means for actuating shutter closing in response to the voltage of said integrating capacitor; and
a correction circuit having an output circuit connected across said integrating capacitor and an input terminal for constantly receiving said output voltage, whereby when said photosensitive element is blocked from the scene light, said current is also controlled by said output voltage generated by said stray light.

# DESIGNS

FEBRUARY 11, 1975

**234,275**
**HAMBURGER BUN**
Irving W. Kosecoff, 3201 Butler Ave., Los Angeles, Calif. 90066
Filed Jan. 30, 1973, Ser. No. 328,053
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—2

**234,276**
**JEWELRY DISPLAY CASE**
Howard Ferguson, Valley Cottage, N.Y., assignor to Bulova Watch Company, Inc., New York, N.Y.
Filed Oct. 30, 1972, Ser. No. 302,471
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—25



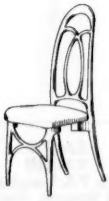
**234,277**
**STOOL**
Philip Robert Salmon, 1416 S. Sheridan Way, Sheridan School of Design, Mississauga, Ontario, Canada, and Hugh Campbell Hamilton, 4 Hedgewood Road, Willowdale, Ontario, Canada
Filed Apr. 23, 1973, Ser. No. 353,601
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26

**234,278**
**EXERCISING STOOL**
Lawrence I. Jacobs, P.O. Box 4092, Palm Springs, Calif. 92262
Filed Feb. 23, 1973, Ser. No. 334,997
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32

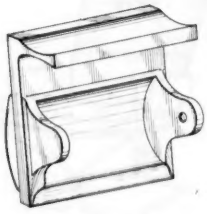
**234,279**
**CHAIR**
Harald Relling, % P.I. Langlos Fabrikker A/S, 6201 Stranda, Norway
Continuation of design application Ser. No. 318,995, Dec. 27, 1972. This application June 14, 1973, Ser. No. 370,019
Claims priority, application Norway July 3, 1972
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—67

234,280
CHAIR
Kenji Ekuan, Tokyo, Japan, assignor to France Bed Co., Ltd., Tokyo, Japan
Filed Feb. 28, 1973, Ser. No. 336,529
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—70

234,281
CHAIR
Akihiko Noda and Akira Hirose, Tokyo, Japan, assignors to France Bed Co., Ltd., Tokyo, Japan
Filed Feb. 28, 1973, Ser. No. 336,528
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—76



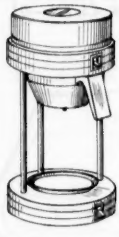
234,282
COMBINED TOILET-TISSUE HOLDER AND SHELF THEREFOR
Philip Boone, 15 Fenwick Road, Winchester, Mass. 01890
Filed Nov. 6, 1973, Ser. No. 413,340
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—97



234,283
COAT HOOK
Ian Rocklif, Billinge, near Wigan, and Harold Speight, Southport, England, assignors to Crompton Nettlefold Stenman Limited, Wigan, Lancashire, England
Filed Oct. 31, 1972, Ser. No. 302,500
Claims priority, application Great Britain June 10, 1972
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—120

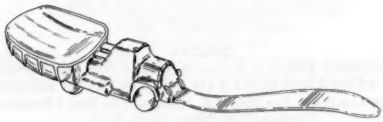
234,284
COFFEEMAKER
Franz Alban Stuetzer, Muehlheim am Main, and Klaus Mayer, Offenbach am Main, Germany, assignors to Rowenta-Werke, G.m.b.H., Offenbach am Main, Germany
Filed Aug. 13, 1973, Ser. No. 388,502
Claims priority, application Germany Feb. 16, 1973
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—62

234,285
COFFEEMAKER
Chester H. Wickenberg, 164 Division St., Elgin, Ill. 60120
Filed July 30, 1973, Ser. No. 384,059
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—85



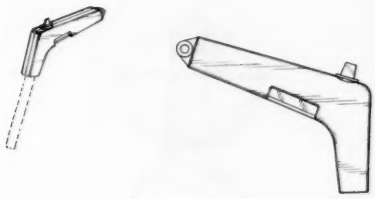
234,286
PORTABLE GRILL
Manley R. MaKenny, Beggs, and Billy Joe Duncan, Tulsa, Okla., and Jay N. Smith, Wichita, Kans., assignors to Brunswick Corporation, Skokie, Ill.
Filed June 11, 1973, Ser. No. 368,599
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—107

234,287
INFANT'S FEEDING SPOON OR THE LIKE
Karl Henry Pearson, Jr., R.D. 1, Prosperity, Pa. 15329
Filed Jan. 18, 1973, Ser. No. 324,774
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—141



234,288
COMBINED LITTER CONTAINER AND ADVERTISING DISPLAY DEVICE
Walter Kay, 815 S. 18th St., Arlington, Va. 22202, and Raymond M. Poelvoorde, Birmingham, Mich.; said Raymond M. Poelvoorde assignor to said Walter Kay
Continuation-in-part of design application Ser. No. 226,383, Feb. 14, 1972, now Patent No. 229,279, dated Nov. 20, 1973. This application Mar. 2, 1973, Ser. No. 337,450
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D7—191

234,289
HAND GRIP FOR AN ELECTRIC GRASS SHEAR OR SIMILAR ARTICLE
Julian R. Haynes, Hinsdale, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Oct. 12, 1972, Ser. No. 297,091
Term of patent 14 years
Int. Cl. D8—*03, 99*
U.S. Cl. D8—8



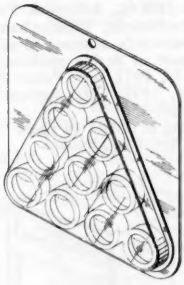
234,290
BOTTLE CUTTING APPARATUS
Ben R. Myrick, P.O. Box 595, Grand Coulee, Wash. 99133, and Wayne E. Myrick, Electric City, Wash. (P.O. Box 1191, Grand Coulee, Wash. 99133)
Filed Feb. 15, 1973, Ser. No. 332,724
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

234,291
**COMBINED BOTTLE AND CAP THEREFOR**
Reginald Malcolm Broadhead, Maidenhead, England, assignor to Crown Distillers Limited, London, England
Filed Aug. 30, 1972, Ser. No. 284,969
Claims priority, application Great Britain Apr. 12, 1971
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—72

234,292
**BOTTLE**
James E. Plummer, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Apr. 9, 1973, Ser. No. 349,116
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—119

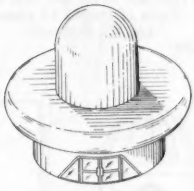
234,293
**BOTTLE OR THE LIKE**
Elton Cohen Toland, 691 Irola, Los Angeles, Calif. 90005
Filed Apr. 2, 1973, Ser. No. 346,733
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—169

234,294
**COMBINED DISPLAY PACKAGE AND DISPENSER FOR CORELESS ROLLS OF DECORATIVE RIBBON**
Myer Gorman, Leonia, N.J., assignor to Sun Chemical Corporation, New York, N.Y.
Filed July 26, 1972, Ser. No. 275,450
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192

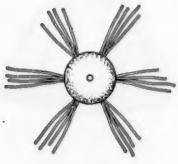


234,295
TIRE
David Lyndon Buck, Sutton Coldfield, England
(% Fort Dunlop, Erdington, Birmingham, England)
Filed Aug. 9, 1973, Ser. No. 387,512
Claims priority, application Great Britain Feb. 22, 1973; Mar. 13, 1973
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—144

234,296
BUILDING
Eufrecio Zamora, Conroe, Tex.
Filed Aug. 9, 1973, Ser. No. 386,966
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1 B

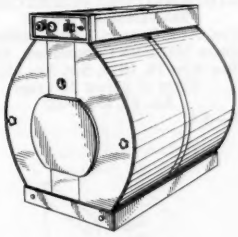


234,297
SOFT LURE BODY
James T. Peterson, 3216 Noble Ave., Minneapolis, Minn. 55422
Filed Apr. 5, 1973, Ser. No. 348,327
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

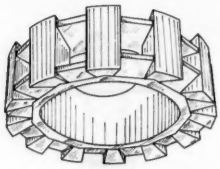


234,298
SEPTIC TANK
William M. Bower, Suffield, Conn., assignor to Bangor Punta Operations, Inc., Greenwich, Conn.
Original design application May 17, 1973, Ser. No. 361,353. Divided and this application July 19, 1974, Ser. No. 489,860
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

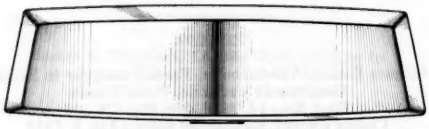
234,299
BOILER
Jacques Escaro, Villemomble, France, assignor to Societe Generale de Fonderie, Paris, France
Filed June 14, 1973, Ser. No. 370,105
Claims priority, application France Jan. 8, 1973
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—86



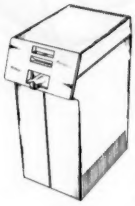
**234,300**
**INJECTION NOZZLE RIM FOR VENTILATING APPARATUS**
Jorgen Holt, Naestved, Denmark, assignor to Nordisk Ventilator Co. Aktieselskab, Naestved, Denmark
Filed July 27, 1973, Ser. No. 383,325
Claims priority, application Denmark Feb. 1, 1973
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—163



**234,301**
**ELECTRONIC DISPLAY UNIT FOR A CASH REGISTER OR SIMILAR ARTICLE**
Lynton Randolph Knapp, Orange, and Ralph Waldo Province, Westminster, Calif., assignors to MSI Data Corporation, Costa Mesa, Calif.
Filed Feb. 10, 1972, Ser. No. 225,364
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

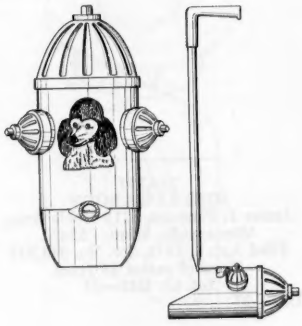


**234,302**
**MAGNETIC CARD READER-RECORDER OR SIMILAR ARTICLE**
Eliot F. Noyes, New Canaan, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 16, 1973, Ser. No. 351,721
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

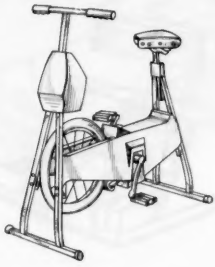


**234,303**
**PRINTING STATION FOR AUTOMATIC DATA PROCESSING**
Charles A. Pycha and Frank Wilkey, Jr., Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 18, 1973, Ser. No. 352,132
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

**234,304**
**PET LITTER RETRIEVER**
William L. Schmieler, 19609 Winslow Road, Cleveland, Ohio 44120
Filed Apr. 23, 1973, Ser. No. 353,548
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99



**234,305**
**BICYCLE EXERCISER**
Thomas G. Woods, Percy A. Collins, and Lewis W. Boyd, Battle Creek, and Bruce G. Remington, Kalamazoo, Mich., assignors to Battle Creek Equipment Co., Battle Creek, Mich.
Filed Aug. 18, 1972, Ser. No. 281,931
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



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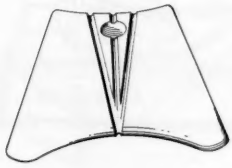
**234,306**
**GAME CLUB HEAD**
Robert T. Cummings, Long Beach, Calif. (E. 12 La Crosse, Spokane, Wash. 99207)
Filed Mar. 9, 1973, Ser. No. 335,061
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CQ



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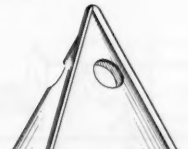
**234,307**
**SUSPENDABLE TOY HOUSE**
Wallace W. Bowley, 57 Westford Road, Stafford Springs, Conn. 06076
Filed June 6, 1973, Ser. No. 367,574
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



**234,308**
**SUSPENDABLE TOY HOUSE**
Wallace W. Bowley, 57 Westford Road, Stafford Springs, Conn. 06076
Filed June 6, 1973, Ser. No. 367,575
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL

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**234,309**
**EXERCISING BAR**
Norman E. Buchner, 2717 S. Florence Drive, Tulsa, Okla. 74114
Filed Aug. 6, 1973, Ser. No. 385,876
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K

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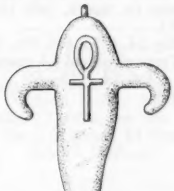
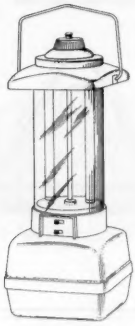
**234,310**
**PENDANT**
Ernest Camerino, 1310 NW. 43rd Ave., Fort Lauderdale, Fla. 33313
Filed May 7, 1973, Ser. No. 358,043
Term of patent 7 years
Int. Cl. D11—*01*
U.S. Cl. D45—16 A

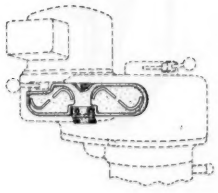


234,311
ELECTRIC LANTERN
Daniel C. Oakley, Madison, Wis., assignor to ESB Incorporated
Filed Nov. 13, 1972, Ser. No. 306,003
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R

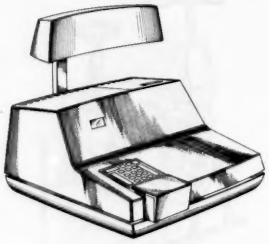


234,312
MUSICAL INSTRUMENT CASE
Hari Matsuda, Evanston, Ill., assignor to G. Leblanc Corporation, Kenosha, Wis.
Filed Oct. 20, 1972, Ser. No. 299,466
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B

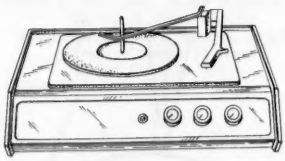
234,313
BELT GUARD FOR A MILLING MACHINE HEAD
Gilbert N. Clay, 6576 White Doe Trail, Rockford, Ill. 61102, and Donn O. Smith, 302 Hosmer St., Loves Park, Ill. 61111
Filed May 24, 1973, Ser. No. 363,520
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D54—14 A



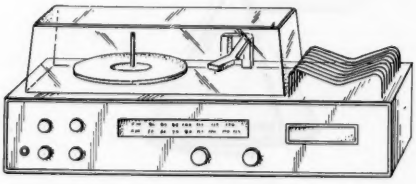
234,314
ELECTRONIC CASH REGISTER
Lynton Randolph Knapp, Orange, and Ralph Waldo Province, Westminster, Calif., assignors to MSI Data Corporation, Costa Mesa, Calif.
Filed Feb. 10, 1972, Ser. No. 225,374
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D52—4 A



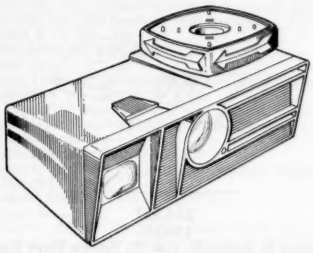
234,315
PHONOGRAPH
Robert F. Mansfield, Tokyo, Japan, assignor to Capehart Corporation, New York, N.Y.
Filed Sept. 18, 1972, Ser. No. 290,074
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R



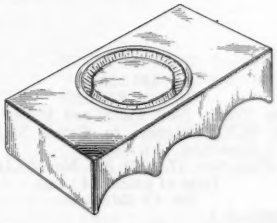
234,316
PHONOGRAPH
Robert F. Mansfield, Tokyo, Japan, assignor to Capehart Corporation, New York, N.Y.
Filed Sept. 18, 1972, Ser. No. 290,219
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R



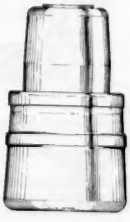
**234,317**
**CAMERA**
**Thomas J. Woods, Sherman Oaks, Calif., assignor to Bank of Montreal (California) Los Angeles, Calif.**
**Filed Apr. 26, 1973, Ser. No. 354,755**
**Term of patent 14 years**
**Int. Cl. D16—*01***
**U.S. Cl. D61—1 B**



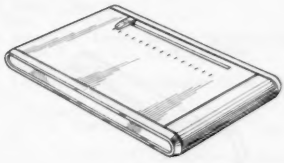
**234,318**
**CONTACT REFRIGERATION UNIT FOR CHILLING DRINKING VESSELS**
**Richard F. Starrett, P.O. Box 838, Tiburon, Calif. 94920**
**Filed July 27, 1973, Ser. No. 383,140**
**Term of patent 14 years**
**Int. Cl. D15—*07***
**U.S. Cl. D67—4**



**234,319**
**ICE CREAM FREEZER**
**Philip A. Knight, Jr., Concord, Mass., assignor to Raytheon Company, Lexington, Mass.**
**Filed Oct. 5, 1973, Ser. No. 404,069**
**Term of patent 14 years**
**Int. Cl. D7—*04***
**U.S. Cl. D67—2 A**

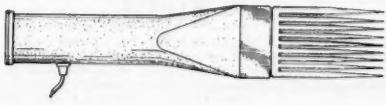


**234,320**
**TELEPHONE LIST FINDER**
**Chuzo Mori, Tokyo, Japan, assignor to Carl Manufacturing Company Ltd., Tokyo, Japan**
**Filed Feb. 20, 1973, Ser. No. 334,045**
**Claims priority, application Japan Sept. 8, 1972**
**Term of patent 14 years**
**Int. Cl. D19—*02***
**U.S. Cl. D74—1 C**



**234,321**
**ADJUSTABLE EAR PLUG OR THE LIKE**
**Frederick C. Visor, Englewood Cliffs, N.J., assignor to Flents Products Co., Inc., New York, N.Y.**
**Filed May 29, 1973, Ser. No. 364,855**
**Term of patent 14 years**
**Int. Cl. D24—*04***
**U.S. Cl. D83—1 J**

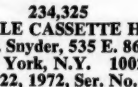
**234,322**
**COMBINED COMB AND HAIR DRYER**
**William D. Smith, P.O. Box 12217, Oakland, Calif. 94604**
**Filed Oct. 17, 1972, Ser. No. 300,415**
**Term of patent 14 years**
**Int. Cl. D28—*03***
**U.S. Cl. D86—8**



234,323
HAIR CURLER
Andre Demi, 71 Avenue Laure, 1080 Brussels, Belgium
Filed Feb. 15, 1973, Ser. No. 332,597
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 E

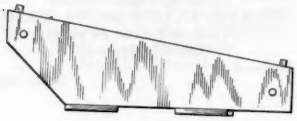
234,324
HAIR CURLER
Andre Demi, 71 Avenue Laure, 1080 Brussels, Belgium
Filed Feb. 15, 1973, Ser. No. 332,598
Claims priority, application Switzerland Sept. 11, 1972
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 E

234,325
ROTATABLE CASSETTE HOLDER
Jeffrey S. Snyder, 535 E. 86th St.,
New York, N.Y. 10021
Filed May 22, 1972, Ser. No. 255,927
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 D

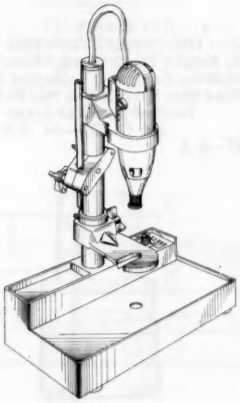


234,326
CARRYING BAG
Osamu Kato, Tokyo, Japan, assignor to Shigematsu Co., Ltd., Okazaki-shi, Japan
Filed Mar. 15, 1973, Ser. No. 341,725
Claims priority, application Japan Sept. 28, 1972
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 F

234,327
LOOM
Marianne S. Rodwell, 114 W. Brown Deer Road,
Milwaukee, Wis. 53217
Filed Apr. 9, 1973, Ser. No. 349,598
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D92—15



234,328
HOMOGENIZER
Douglas S. Fraser, New Paltz, and Robert P. Adams, Walden, N.Y., assignors to Cenco Medical/Health Supply Corporation, Chicago, Ill.
Filed Nov. 17, 1972, Ser. No. 307,410
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D98—1 A



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Broling, Fred W.; Baker, Jeffrey A.; and Matras, Edward J., 3,865,727.

Baker, Richard H.: *See*—
Bannister, Lawrence H.; and Baker, Richard H., 3,866,060.

Baldwin, John J.; and Novello, Frederick C., to Merck & Co., Inc. 1,2,4-Triazoles for treating gout and hyperuricemia. 3,865,945, Cl. 424-263.000.

Bales, John W., Jr.; and Orehoski, Michael A., to United States Steel Corporation. Deep drawing sheet steel. 3,865,643, Cl. 148-36.000.

Balla Nee Kosoczky, Bolya: *See*—
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Ballantyne, David B.; Mantel, Edward R.; and Robinson, George H., to General Motors Corporation. Plastically deformed hardened steel parts and method of forming same. 3,865,638, Cl. 148-12.100.

Bancel, Guy Henri. Guide device for the haulage attachments of a ski-lift or similar device. 3,865,044, Cl. 104-197.000.

Banks, Bruce A., to United States of America, National Aeronautics and Space Administration. Method of making dished ion thruster grids. 3,864,797, Cl. 29-25.180.

Banks, Robert L.; and Kenton, Joseph R., to Phillips Petroleum Company. Catalyst for conversion of olefins. 3,865,751, Cl. 252-457.000.

Bannister, Lawrence H.; and Baker, Richard H., to Massachusetts Institute of Technology. Electric power source. 3,866,060, Cl. 307-43.000.

Barashkov, Ruslan Yakolevich: *See*—
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Barber-Colman Company: *See*—
Clements, Ralph E., 3,866,135.

Barbier, Maurice, to Societe Nationale des Petroles d'Aquitaine. Method of exploring a medium and its applications in seismic exploration. 3,866,174, Cl. 340-15.5TA.

Barker, Joseph K. Portable collapsible shelter. 3,865,429, Cl. 297-184.000.

Barkley, James H. Electronic medical warning device. 3,866,204, Cl. 340-279.000.

Barkow, William Henry, to RCA Corporation. Incline electron gun having magnetically permeable plates for enhancing convergence of electron beams. 3,866,080, Cl. 313-412.000.

Barmby, David S.: *See*—
Kirsch, Francis William; Barmby, David S.; and Potts, John D., 3,865,894.

Barnes, Cecil R. Apparatus for balancing tire and wheel assemblies. 3,864,980, Cl. 73-484.000.

Barnhart, Damon. Arrangement for securing swinging doors of vehicles. 3,865,426, Cl. 296-50.000.

Barr, Frederick J., Jr.; Mayne, W. Harry; and Ray, Clifford H., to Petty-Ray Geophysial, Inc. Method and apparatus for obtaining a more accurate measure of input seismic energy. 3,866,161, Cl. 340-15.5CP.

Barr, Irwin R. Deterrent ammunition projectile. 3,865,038, Cl. 102-92.700.

Barry, Walton W. Die assembly for use in a machine and method for forging upsets on a metal blank. 3,864,956, Cl. 72-338.000.

Barry Wright Corporation: *See*—
Dean, Carl J.; and Wright, David M., 3,865,445.

Barten, Piet Gerard Joseph, to U.S. Philips Corporation. Cathode ray tube for displaying coloured pictures. 3,866,082, Cl. 313-470.000.

Barton, Raymond W. Infant tube feeding adapter. 3,865,107, Cl. 128-222.000.

Baskin, Steven I., to Matthews, Donnell R., Jr. Lyophilic waste disposal. 3,864,840, Cl. 34-5.000.

Bastian, Jean-Michel. 4-Oxo-4H-benzo [4.5]cyclohepta[1,2-b]thiophene derivatives. 3,865,843, Cl. 260-332.20A.

Bastide, Paul. Special submarine devices using a novel integrated lift, propulsion and steering system. 3,865,060, Cl. 114-16.00R.

Bates, Gregory John. Vehicle suspensions. 3,865,396, Cl. 280-124.00R.

Bates, Howard John: *See*—
White, Robert Miles; and Bates, Howard John, 3,865,066.

Bauer, William H., to Textron, Inc. Deployable load buoyancy support container or shelter system. 3,864,771, Cl. 9-8.00R.

Bauer, William V.: *See*—
Long, Raymond H.; and Bauer, William V., 3,865,574.

Baugh, Charles Richmond; and Wooley, Bruce Allen, to Bell Telephone Laboratories, Incorporated. Two's complement parallel array multiplier. 3,866,030, Cl. 235-164.000.

Baumann, Heinz. Apparatus for slitting and opening a knit tube. 3,864,794, Cl. 26-55.00C.

Baumgard, Larry G.: *See*—
Cronauer, Donald C.; and Baumgard, Larry G., 3,865,870.

Bausch & Lomb Incorporated: *See*—
Morton, Roger Roy Adams, 3,865,493.

Baxter Laboratories, Inc.: *See*—
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Bayer Aktiengesellschaft: *See*—
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Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, 3,865,858.
Schubert, Hans-Werner; Behner, Otto; and Hoffmeister, Friedrich, 3,865,834.
Wingler, Frank; Muller, Richard; and Pollheide, Dieter, 3,865,904.

Beaird-Poulan, Inc.: *See*—
McDermott, John W., 3,865,213.

Beaman, Alden Gamaliel; and Tautz, William Paul, to Hoffmann-La Roche Inc. (2-Nitro-1-imidazolyl)-carbamates. 3,865,823, Cl. 260-247.20B.

Bear Manufacturing Corporation: *See*—
Butler, Louis L., 3,865,492.

Beasom, James D., to Harris-Intertype Corporation. Fabrication of MOS devices and complementary bipolar transistor devices in a monolithic substrate. 3,865,649, Cl. 148-187.000.

Beatrice Foods Co.: *See*—
Guzzo, Francesco, 3,865,529.

Beaudoin, Andre. Core plug. 3,865,326, Cl. 242-68.600.

Becknell, Joseph: *See*—
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Becton, Dickinson and Company: *See*—
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Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.
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Bedford, Billy R.: *See*—
Klett, Gene R.; Bedford, Billy R.; and Casey, Thomas P., 3,864,853.

Beebe, Louis S. Method of preparing lumber having properties of clear grade lumber from common grade lumber. 3,865,681, Cl. 156-264.000.

Beermann, Claus: *See*—
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Begun, Robert A.; Thuse, Erik; and McGee, Arthur L., to FMC Corporation. Electric remote control system for underwater wells. 3,865,142, Cl. 137-635.000.

Beheyt, John E.: *See*—
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Behner, Otto: *See—*
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Beiswenger, John L., to National Presto Industries, Inc. Security alarm device. 3,866,201, Cl. 340-274.000.

Bell & Howell Company: *See—*
Clever, Raymond E.; Hapke, Kenyon A.; and Wells, Thomas R., 3,865,331.

Bell Telephone Laboratories, Incorporated: *See—*
Andres, Klaus; Bucher, Ernest; and Wernick, Jack Harry, 3,865,557.
Baugh, Charles Richmond; and Wooley, Bruce Allen, 3,866,030.
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Hess, William Emil, Jr.; and Vella-Coleiro, George Philip, 3,866,145.
Jaeger, Raymond Edward; and Logan, Walter, 3,865,564.
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Wilde, Peter Van Dyke, 3,865,624.
Yi Cho, Alfred; and Reinhart, Franz Karl, 3,865,625.

Bell, William T., to Schlumberger Technology Corporation. Methods and apparatus for testing earth formations composed of particles of various sizes. 3,864,970, Cl. 73-155.000.

Bellasio, Elvio: *See—*
Cavalleri, Bruno; Bellasio, Elvio; Testa, Emilio; and Maffii, Giulio, 3,865,847.

Bellot, Jean; Hugo, Michel; Thuillier, Jacques; and Hubert, Roger, to Societe des Acieries du Manoir-Pompey. Method of manufacture improving the behaviour of welded heat-resistant steel parts. 3,865,639, Cl. 148-127.000.

Beloit Corporation: *See—*
Langdon, Roy A.; and Gerschon, Wilfried R., 3,865,535.
Moore, Lawrence A.; and Welty, Donald R., 3,865,531.

Belton Electronics Corporation: *See—*
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Beltone Electronics Corporation: *See—*
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Bendall, Dennis M.; Harris, William R.; Summers, Peter; Pyart, Raymond S.; Kew, Jeffrey; Sherborne, Michael C. D.; Caldwell, Alistair J.; Thorp, Peter M.; and Jones, John A., to Rank Xerox Ltd. Electrostatographic copying machine. 3,865,482, Cl. 355-14.000.

Bender, Bernard A. Combination telephone and calculator. 3,865,994, Cl. 179-90.00K.

Bendix Corporation, The: *See—*
Cutler, Hymie; and Vadasy, Donald, 3,866,027.
Shaw, Benjamin Chandler, 3,866,107.
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Benjamin, Benny Moses: *See—*
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Benjamin, John Stanwood: *See—*
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Volin, Timothy Earl; and Benjamin, John Stanwood, 3,865,586.

Benneche, Chris; Brochu James W.; and Conner, Jack S., to Northrop Corporation. Radar-augmented sub-target. 3,866,226, Cl. 343-18.00B.

Bennett, Henry J.: *See—*
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Bennett, Sedgwick R.: *See—*
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Bennett, Victor A., Jr., to Currier-Smith Corporation. Monitoring transmission link by comparing pseudorandom signals. 3,866,217, Cl. 340-416.000.

Benz, Hans, to Brown Boveri-Sulzer Turbomachinery Ltd. Axial compressor. 3,865,504, Cl. 415-113.000.

Bereman, Jon A.: *See—*
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Berg, Frances H., executrix: *See—*
Berg, Quentin, deceased; and , 3,865,455.

Berg, Quentin, deceased (by Berg, Frances H., executrix); and , to du Pont de Nemours, E. I., and Company. Circuit board socket. 3,865,455, Cl. 339-17.00C.

Berger, Judo Lewis. Recording and playback device without moving parts. 3,866,189, Cl. 340-173.200.

Berger, Julius; Pruess, David; and Scannell, James Parnell, to Hoffmann-La Roche Inc. Fermentative preparation of L-2-amino-4(2-aminoethoxy)-butanoic acid. 3,865,694, Cl. 195-80.00R.

Bergfjord, John A.: *See—*
Radler, Richard W., Jr.; Millonzi, Richard P.; and Bergfjord, John A., 3,865,798.

Berka, George B.: *See—*
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Berkley & Company, Inc.: *See—*
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Berns, Charles, to General Signal Corporation. Method of making a buzzer structure. 3,864,823, Cl. 29-602.000.

Berns, Charles, to Edwards Company Inc. Audible signal apparatus. 3,866,203, Cl. 340-274.000.

Bernz-O-Matic Corporation: *See—*
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Berther, Clau: *See—*
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Berton, Georges Albert: *See—*
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Bertsch, Richard: *See—*
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Betz Laboratories, Inc.: *See—*
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Beyerlein, Ludwig: *See—*
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Beymes, Johannes Frentzel; and Quast, Christoph, to Palitex Project Company GmbH. Wetting mechanism for a textile yarn processing machine. 3,864,901, Cl. 57-35.000.

Bilbrey, Robert A.; and Maytham, Walter J., to Speed Systems. Cable scribing tool. 3,864,828, Cl. 30-91.200.

Billings, Charles Alden: *See—*
O'Neill, Gerald Joseph; Simons, Charles William; and Billings, Charles Alden, 3,865,950.

Binder, Erich, to Gretag Aktiengesellschaft. Film unwinding system. 3,865,324, Cl. 242-67.10R.

Binder, Walter: *See—*
Stich, Heinrich; Binder, Walter; Hutter, Josef; and Marecek, Helmut, 3,865,602.

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Birkholtz, Gottfried, to Carl Schenck AG. Load cell. 3,866,157, Cl. 338-5.000.

Birtwell, William C.; and Norton, Robert L.; to Hemodyne, Inc. External cardiac assist apparatus. 3,865,102, Cl. 128-64.000.

Bishop, Jerry B.: *See—*
Owens, Frederick J.; and Bishop, Jerry B., 3,864,838.

Bishop, Virginia H. Decorative belt buckle. 3,864,791, Cl. 24-163.000.

Black, Arthur L., to Ingersoll-Rand Company. Flexible coupling means. 3,864,940, Cl. 64-13.000.

Black, Rexford E.: *See—*
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Blackwell, John; and Fendglis, Richard A., to du Pont de Nemours, E. I., and Company. Yellow 3'-hydroxyquinophthalone-5-(p-phenylazo)carboxanilide dye. 3,865,804, Cl. 260-155.000.

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Blair, Edgar A., to Princeton Polymer Laboratories, Incorporated. Carboxylated acrylonitrile-butadiene latex fabric coating. 3,865,622, Cl. 117-161.0UT.

Blake, Frederick D., to Minnesota Mining and Manufacturing Company. Water-dispersible pressure-sensitive adhesive, tape made therewith, and novel tackifiers therefor. 3,865,770, Cl. 260-27.00R.

Blaw-Knox Food and Chemical Equipment, Inc.: *See—*
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Blaw-Knox Foundry & Mill Machinery, Inc.: *See—*
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Blinder, Marvin, to Loral Corporation. Adapter for high density connectors. 3,865,454, Cl. 339-17.00C.

Block, Jacob; Herbst, Richard J.; and Triggiani, Leonard V., to W. R. Grace & Co. Process for the preparation of metal carbide and metal oxide microspheres. 3,865,745, Cl. 252-301.10R.

Blood Services: *See—*
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Blossom, Armond L., to Coleman Company, The. Combination air conditioner and heater. 3,865,182, Cl. 165-27.000.

Blount & George: *See—*
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Boberg, Anders, to Akerlung & Rausing. Polymer composition degradable under the influence of ultraviolet light and/or sunlight. 3,865,767, Cl. 260-23.00H.

Bochan, John, to General Electric Company. Automatic belt tightener. 3,864,986, Cl. 74-226.000.

Boehringer Ingelheim G.m.b.H.: *See—*
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Boehringer Mannheim G.m.b.H.: *See—*
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Bogart, George E.; Gallagher, Robert T.; and Lolli, Lawrence V., to Marathan Manufacturing Company. Artificial tree construction. 3,865,676, Cl. 161-24.000.

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Bokelman, Harold L. Drafting device. 3,864,833, Cl. 33-76.00R.

Boksjo, Carl Ingvar; and Olsson, Karl Erik, to Allmanna Svenska Elektriska Aktiebolaget. Protection means against auto-ignition for the rectifiers of a static converter. 3,865,438, Cl. 321-13.000.

Bolex International SA: *See—*
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Bolling, Robert W.; and Reeves, Jerry H., to Union Camp Corporation. Method of making bags with film liners. 3,865.019, Cl. 93-35.00R.

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Boontje, Jan Th., to Verenigde Kunstmestfabrieken Mekog-Albatros N.V. Process for the preparation of crystalline calcium sulphate and phosphoric acid. 3,865,922, Cl. 423-166.000.

Boothman, David Richard; and Nutt, David Walter, to Canadian General Electric Company Limited. Inhibited power supplies. 3,866,094, Cl. 317-31.000.

Borbely, Alexander S.; and Bereman, Jon A., to P. R. Mallory & Co. Inc. Method of coating a die cavity surface and the coated surface. 3,865,608, Cl. 117-5.300.

Boren, Paul D. Forward draw revolver holster. 3,865,289, Cl. 224-2.00B.

Borg-Warner (Australia) Limited: *See—*
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Borg-Warner Corporation: *See—*
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Borgmann, John P., to American Chemical & Refining Company Inc. Method for continuous high speed electroplating of strip, wire and the like. 3,865,701, Cl. 204-28.000.

Borski, William J., to Faustel Inc. Machine for making file folders. 3,865,017, Cl. 93-1.00E.

Boschman, Theodorus Antonius Cornelis; and Korsloot, Jacob Gerard, to U.S. Philips Corporation. Substituted, 6,7 ethylenedioxy 4 hydroxy 3 non oxo carbonylic quinolines. 3,865,832, Cl. 260-287.00R.

Bossler, Franklin B.: *See—*
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Boston Machine Works Co.: *See—*
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Boston, Ronald E.: *See—*
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Bostwick, Norvan W.; and Daborowski, Ignace J., to Ambac Industries, Inc. Excess fuel starting device for diesel engines. 3,865,091, Cl. 123-139.0ST.

Bott, Barry; Firth, Jack Graham; Jones, Alan; and Jones, Thomas Alwyn, to National Research Development Corporation. Semiconducting gas sensitive devices. 3,865,550, Cl. 23-232.00E.

Boulter, Thomas W.; and Van Zyl, Bernard, to United States of America, Air Force. Submissible air-to-surface warhead with propellant-diaphragm deployment mechanism. 3,865,034, Cl. 102-7.200.

Bourbeau, Frank J., to General Motors Corporation. Motor power supply system. 3,866,099, Cl. 318-254.000.

Bourcier de Carbon de Previnquieres, Alain. Snow chains and apparatus for their automatic remote fastening on the tire. 3,865,168, Cl. 152-213.00A.

Bourdeau, Romeo G.: *See—*
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Bouteiller, Charles A.: *See—*
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Bouty, Lucien Robert; and LeCardonnel, Gerard Marcel, to International Standard Electric Corporation. Electronically controlled ring-trap circuit. 3,865,992, Cl. 179-18.0HB.

Bowen, Duane C. Bathing facility. 3,864,760, Cl. 4-146.000.

Bowers, Bernard P.; and Breidegam, Delight E., Jr., to East Penn Mfg. Co., Inc. Universal battery lifter. 3,865,419, Cl. 294-63.00B.

Bowler, Katherine A.: *See—*
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Bowles, Joseph E. Soil pulverizing device. 3,865,320, Cl. 241-278.00R.

Bowman, Bobby R.: *See—*
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Drelich, Arthur H.; and Bowman, Bobby R., 3,865.765.
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Bracken, Lee H. Portable tent. 3,865,123, Cl. 135-4.00R.

Bradbury, Rudolph A.: *See—*
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Bradley, Walter W.; and Blair, Charles S., Jr. Drive transmission. 3,864,985, Cl. 74-125.500.

Brander, Richard: *See—*
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Branick, Charles Earl. Tire bead breaking apparatus. 3,865,172, Cl. 157-1.260.

Bras S.p.A.: *See—*
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Brasier, Charles A. Signaling the location of underwater wells. 3,866,160, Cl. 340-5.00R.

Bratt, Axel Erland; Holst, Oscar Evert Ingemar; and Petre, James Gusten Ragnar, to SKF Industrial Trading and Development Company N.V. Press fit joints for mounting by means of a pressure medium. 3,865,497, Cl. 403-15.000.

Braune, Rudi Helmut. Road adjusted wheelbarrow chassis. 3,865,393, Cl. 280-47.260.

Brehm, Alma Louise. Mini-masher. 3,865,317, Cl. 241-169.200.

Breidegam, Delight E., Jr.: *See—*
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Brenan, Robert R.; Bunker, Thomas D.; and Thompson, David F., to GTE Sylvania Incorporated. Fabrication Packages Suitable for Integrated Circuits. 3,864,820, Cl. 29-591.000.

Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Fighting figure toy. 3,864,870, Cl. 46-142.000.

Breslow, Jeffrey D.; and Glass, Marvin I., to Marvin Glass & Associates. Game apparatus. 3,865,367, Cl. 273-1.00E.

Breslow, Jeffrey D., to Marvin Glass & Associates. Board game apparatus. 3,865,379, Cl. 273-134.00A.

Breslow, Jeffrey D.: *See—*
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Breukink, Karel W.; and Van Praag, Michel, to International Flavors & Fragrances Inc. Edible compositions having a poultry meat flavor and processes for making same. 3,865,958, Cl. 426-211.000.

Breuner, Gerald L. Rotor blade and hub attachment and control. 3,865,511, Cl. 416-141.000.

Briar, John R., to General Motors Corporation. Electromagnetic spring-wound clutch. 3,865,222, Cl. 192-48.200.

Bridgestone Tire Company Limited: *See—*
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Bridigum, Robert J.; and Nebiolo, Renaldo A., to Westinghouse Air Brake Company. Visual coupling indicator for automatic railway car couplers. 3,865,252, Cl. 213-75.00R.

Briggs, Hartwell L.: *See—*
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Bright, James A., to General Motors Corporation. Defrost timer arrangement for making clear ice. 3,864,933, Cl. 62-137.000.

Brink, Robert H., Jr.: *See—*
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Brinkmann, Bernd; and Griebsch, Eugen. Certain enamine compounds and methods for making and using the same. 3,865,791, Cl. 260-77.5CH.

British Ropes Limited: *See—*
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British Steel Corporation: *See—*
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Brochu James W.: *See—*
Benneche, Chris; Brochu James W.; and Conner, Jack S., 3,866,226.

Broecker, Franz Josef; Kaempfer, Knut; Marosi, Laslo; Schwarzmann, Matthias; and Triebskorn, Bruno. Process for the preparation of a nickel magnesium aluminum catalyst. 3,865,753, Cl. 252-466.00J.

Broeker, Herbert H.: *See—*
Donovan, Robert W.; Kolster, Harvey L.; Broeker, Herbert H.; and Bailey, George W., 3,865,248.

Broling, Fred W.; Baker, Jeffrey A.; and Matras, Edward J., to FMC Corporation. Pumping apparatus with separating mechanism. 3,865,727, Cl. 210-162.000.

Brooks, Harold W. Method of controlling tissue hypothermia. 3,865,116, Cl. 128-400.000.

Brooks, William Victor Hayes, to Domtar Limited. Easily disposable diaper with sealing bead. 3,865,111, Cl. 128-287.000.

Brosene, William G., Jr., to Magnum Automotive, Inc. Lower bead breaker adapter. 3,865,171, Cl. 157-1.240.

Brown Boveri-Sulzer Turbomachinery Ltd.: *See—*
Benz, Hans, 3,865,504.

Brown, Claude H.: *See—*
Dorrough, Vernon R.; and Brown, Claude H., 3,865,436.

Brown, Richard L.: *See—*
Gogolick, Roland M.; Brown, Richard L.; and Finney, William J., 3,864,772.

Broyde, Barret, to Western Electric Company, Incorporated. Additives to negative photoresists which increase the sensitivity thereof. 3,865,597, Cl. 96-115.00R.

Bruce, John MacMillan, Jr., to du Pont de Nemours, E. I., and Company. Catalytic chlorofluorination of isopropyl fluoride to 1,1,2-trichlorotrifluoropropene-1. 3,865,885, Cl. 260-653.300.

Brude, Berton H. Telephone number recorded and reminder. 3,864,857, Cl. 40-77.400.

Brudi Equipment, Inc.: *See—*
Brudi, Ronald A.; Matthewson, Randall W.; and Wheeler, Randall P., 3,865,265.

Brudi, Ronald A.; Matthewson, Randall W.; and Wheeler, Randall P., to Brudi Equipment, Inc. Lift truck safety accessory. 3,865,265, Cl. 214-674.000.

Bruenig, Matthias. Safety head rest for automobile seats and the like. 3,865,450, Cl. 297-397.000.

Brunger, William Ernest; Madden, Stanley Gordon; and Sawyer, Benjamin Robinson, to Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain, The. Firearms. 3,864,862, Cl. 42-84.000.

Brunswick Corporation: *See—*
Frazzell, Michael E.; and Snyder, Richard H., 3,865,509.
Haasl, William D., 3,865,068.

Brusch, Paul C. Cylindrical stock machining apparatus. 3,864,816, Cl. 29-563.000.

Bruson, Herman A.; and Gould, Henry, to Milchem Incorporated. Polyhydroxy compositions. 3,865,793, Cl. 260-78.50R.

BTR Industries Limited: *See—*
Lochrie, Leonard Marshall, 3,864,852.

Bucher, Ernest: *See—*
Andres, Klaus; Bucher, Ernest; and Wernick, Jack Harry, 3,865,557.

Buchholz, Willi: *See—*
Detert, Ernst-Rolf; and Buchholz, Willi, 3,865,120.

Buchner, Werner: *See—*
Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, 3,865,858.

Buck, Daniel C., to Westinghouse Electric Corporation. Paramagnetic sample arrangement for ECM false echo generation. 3,866,225, Cl. 343-18.00E.

Buckley, Norman Frank: *See—*
Holt, Barry; and Buckley, Norman Frank, 3,865,363.

Bueckner, John E., Sr. Prime mover for trailers and the like. 3,865,204, Cl. 180-12.000.

Buehl, Russell C., to Crucible Inc. Method for the nonconsumable electrode melting of reactive metals. 3,865,174, Cl. 164-52.000.

Buffet Crampon: *See—*
Carree, Robert Victor, 3,865,005.

Buhler, George V.: *See—*
United States of America, National Aeronautics and Space Administration; Buhler, George V.; and Havens, Dale E., 3,864,953.

Buhrke, Rolfe E.; Chang, Gregory I.; and Horiuchi, Edward M., to GTE Automatic Electric Laboratories Incorporated. Timing monitor circuit for central data processor of digital communication system. 3,866,184, Cl. 340-172.500.

Builders Brass Works: *See—*
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Bullard, Edward M.: *See—*
Nahmias, Michael A.; and Bullard, Edward M., 3,865,903.

Bullock, Thomas B.: *See—*
Simon, James B.; and Bullock, Thomas B., 3,866,212.

Bunker, Thomas D.: *See—*
Brenan, Robert R.; Bunker, Thomas D.; and Thompson, David F., 3,864,820.

Burdett Manufacturing Company: *See—*
Wick, Richard G.; and Bennett, Henry J., 3,865,076.

Bures, Alan R., to University of California, The Regents of the. Transvenous coaxial catheter. 3,865,118, Cl. 128-404.000.

Burg, Joseph L. Shock absorbing bumper. 3,865,416, Cl. 293-87.000.

Burgdorf, Jochen; and Stoka, Roberto, to ITT Industries, Inc. Spot-type disc brake. 3,865,215, Cl. 188-73.600.

Burge, Harland L., Jr.; and Salvinski, Richard J., to TRW Inc. Piezoelectric voltage generator. 3,865,539, Cl. 431-255.000.

Burger Eisenwerke AG: *See—*
Frank, Martin; and Frank, Karl, 3,864,936.

Burgess, Thomas H.; and Herzl, Peter J., to Fischer & Porter Co. Signal recovery system for vortex type flowmeter. 3,864,972, Cl. 73-194.00B.

Burkart, Robert C.: *See—*
Eash, Robert E.; and Burkart, Robert C., 3,864,822.

Burns, Robert V., to GTE Automatic Electric Laboratories Incorporated. Circuit for eliminating contact bounce effect. 3,866,092, Cl. 317-9.00C.

Burpulis, John Samuel; Souffie, Robert David; Counceller, John D.; and De Capite, Robert, to du Pont de Nemours, E. I., and Company. Apparatus. 3,865,354, Cl. 259-191.000.

Burroughs Corporation: *See—*
Wen, Samuel S.; and Nelson, Donald J., 3,866,061.

Burtis, Wilson A. Liquid homogenizing device. 3,865,350, Cl. 259-1.00R.

Burwell, Blair T.: *See—*
Wilson, David; and Burwell, Blair T., 3,865,541.

Burzen, Norman J., to Nordon Industries,Inc. Timing apparatus. 3,866,101, Cl. 318-487.000.

Busch, Albert G., to A. G. Busch & Co. Inc. Electrical adapter plug. 3,865,463, Cl. 339-176.00R.

Butler, Claud D.: *See—*
Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., 3,865,735.

Butler, Louis L., to Bear Manufacturing Corporation. Apparatus for use in aligning wheels. 3,865,492, Cl. 356-155.000.

Buttel, Helmut, to International Standard Electric Corporation. Method of manufacturing a sealed contact. 3,864,826, Cl. 29-630.00B.

Butters, Jeff A. Dent deflector for mobile homes. 3,865,358, Cl. 267-140.000.

Byrd, Carl; and Mueller, Martin, to Owens-Illinois, Inc. Apparatus for filling containers. 3,865,281, Cl. 222-252.000.

C. J. Patterson Company: *See—*
Linn, Carl B.; and Baiocchi, Fred, 3,865,855.

Cairns, Robert Lacock: *See—*
Volin, Timothy Earl; Benjamin, John Stanwood; Larson, Jay Michael; and Cairns, Robert Lacock, 3,865,575.

Caldwell, Alistair J.: *See—*
Bendall, Dennis M.; Harris, William R.; Summers, Peter; Pyart, Raymond S.; Kew, Jeffrey; Sherborne, Michael C. D.; Caldwell, Alistair J.; Thorp, Peter M.; and Jones, John A., 3,865,482.

Callahan, Joseph W.; and Landry, Charles A., to Cesco, Inc. Removal of polymer residue from surfaces of processing equipment. 3,865,628, Cl. 134-2.000.

Camardella, Giuseppe. Automatic coils winding turret machine. 3,865,152, Cl. 140-1.000.

Campbell, Max L., to Hydro-Flex Corporation, Inc. Floating meter mount. 3,865,338, Cl. 248-295.000.

Camper & Nicholsons (Holdings) Limited: *See—*
Phipps, Richard John, 3,865,710.

Canada Wire and Cable Limited: *See—*
Leuenberger, Urs, 3,864,869.

Canada, Atomic Energy of, Limited: *See—*
Whitfield, Douglas, 3,866,050.

Canadian General Electric Company Limited: *See—*
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Canadian Mine Services Ltd.: *See—*
Crawshay, Richard; and Hradil, John Helmut, 3,865,208.

Canadian Patent and Development Limited: *See—*
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Canadian Patents and Development Limited: *See—*
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Tanney, John W., 3,864,971.

Canadian Thermo Images, Ltd.: *See—*
Agusto, Robert G.; Taylor, Francis A.; and Briggs, Hartwell L., 3,865,884.

Cand A Laboratories, Inc.: *See—*
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Canon Mills Co.: *See—*
Kester, Melvin E., 3,865,234.

Cardenas, Richardo L.: *See—*
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Carl Pedro and Sons, Inc.: *See—*
Pedro, Eugene M., 3,865,166.

Carl Schenck AG: *See—*
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Carlin, Joseph T.; and Cardenas, Richardo L., to Texaco Inc. Oil recovery process using surfactant mixtures. 3,865,187, Cl. 166-273.000.

Carlson, Gunnar Olof. Throw-away teeth protector. 3,864,832, Cl. 32-40.00R.

Caroli, Italo, to DBM Industries Ltd. Vacuum apparatus. 3,865,359, Cl. 269-21.000.

Caron, Lionel, to Bell Telephone Laboratories, Incorporated. Communication system for transmitting data words prior to receipt of acknowledgments for previously transmitted data words. 3,866,172, Cl. 340-147.00R.

Carree, Robert Victor, to Buffet Crampon. Wind musical instrument. 3,865,005, Cl. 84-380.000.

Carrier Corporation: *See—*
Hayes, Richmond S., Jr., 3,864,938.
Hayes, Richmond S., Jr., 3,865,344.
Kropiwnicki, Tadek M., 3,865,345.
Simmons, Walter H.; and Almilli, Saleh H., 3,865,517.

Carroll, Raymond L.: *See—*
Norris, Dale M.; Reynolds, John F.; and Carroll, Raymond L., 3,864,874.

Carson, John Robert, to McNeil Laboratories, Inc. Process of preparing 1,4-diloweralkyl-3-loweralkoxy-carbonyl-2-acetates. 3,865,840, Cl. 260-326.460.

Carter, Clyde Thomas, to AMP Incorporated. Low insertion force receptacle and cammed housing. 3,865,457, Cl. 339-74.00R.

Carter, Harry T., to Fibrac, Inc. Collapsible mop frame improvement. 3,864,782, Cl. 15-147.00A.

Cartier, Jean-Pierre; Winn, David; and Stelmach, Anthony L. Electrical control circuit. 3,866,019, Cl. 219-485.000.

Casey, Thomas P.: *See—*
Klett, Gene R.; Bedford, Billy R.; and Casey, Thomas P., 3,864,853.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Schnee, Karl; Tichy, Dieter; and Engelhardt, Friedrich, 3,865,683.

Castonguay, Roger A.: *See—*
Wenckus, Joseph F.; Castonguay, Roger A.; Hanfly, Bernard C.; and Mallahan, Francis J., 3,865,554.

Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L., to International Business Machines Corporation. Method of making a common emitter transistor integrated circuit structure. 3,865,648, Cl. 148-175.000.

Caterpillar Tractor Company: *See—*
Klett, Gene R.; Bedford, Billy R.; and Casey, Thomas P., 3,864,853.
McWilliams, Orcenith D.; and Rice, Roger A., 3,865,135.

Cavalleri, Bruno; Bellasio, Elvio; Testa, Emilio; and Maffii, Giulio, to Lepetit S.p.A. Gruppo per la Ricerca Scientifica e la produzione Chemica Farmaceutica. Ethyl fluoro-(2-dibenzofuranyl)-acetate. 3,865,847, Cl. 260-346.20M.

Cavanagh, John Denis, to RCA Corporation. Spacecraft attitude control system. 3,866,025, Cl. 235-150.200.

Caveney, Jack E.; and Randolph, Franklin L., to Panduit Corporation. Container. 3,865,300, Cl. 229-7.00R.

Cebula, Leonard A.; Fitzpatrick, Joseph F., Jr.; and Kershaw, Justin A., Jr., to Technitrol, Inc. Signal measuring and counting apparatus and methods. 3,866,126, Cl. 328-15.000.

Cecchetti, Claudio, to Arco Falc srl. Convertible leg assembly. 3,865,050, Cl. 108-19.000.

Cegedur GP: *See—*
Sabetay, Leon, 3,865,560.

Celanese Corporation: *See—*
Chenevey, Edward C.; Druin, Melvin L.; and Oringer, Kenneth, 3,865,876.

Cellu Products Company: *See—*
Doll, Brendan L., 3,864,877.

Central Electricity Generating Board: *See—*
Freck, David Vernon, 3,866,043.

Cesco, Inc.: *See—*
Callahan, Joseph W.; and Landry, Charles A., 3,865,628.

Cessna, Lawrence C., Jr., to Hercules Incorporated. Micro-parallel plate plastometer and viscometry method. 3,864,961, Cl. 73-54.000.

Chabardes, Pierre; Julia, Marc; and Menet, Albert, to Rhone-Poulenc S.A. Unsaturated sulphones. 3,865,878, Cl. 260-590.000.

Champlin, H. H.: *See—*
Danford, Jack De Wayne, 3,865,056.

Chan, Allan P.: *See—*
Parups, Edwin V.; and Chan, Allan P., 3,865,569.

Chang, Chi Shih; and Jen, Teh-Sen, to International Business Machines Corporation. Complementary field effect transistor having p doped silicon gates and process for making the same. 3,865,654, Cl. 148-187.000.

Chang, Gregory I.: *See—*
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Chang, Joseph J.: *See—*
Agusta, Benjamin; Chang, Joseph J.; and Joshi, Madhukar L., 3,865,652.

Chapman, Brian Samuel: *See—*
Ross, John Edward; Marshall, David James; and Chapman, Brian Samuel, 3,865,613.

Charland, Terrence D.; and Klett, Stanley D., to Xerox Corporation. Magnetic brush developing apparatus. 3,865,081, Cl. 118-637.000.

Charles, John Frederick; and Markovchik, Carl Joseph, to du Pont de Nemours, E. I., and Company. Doffing cutter with pickup. 3,864,999, Cl. 83-100.000.

Charles S. Naiman: *See—*
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Chas. S. Tanner Co.: *See—*
Lindemann, Martin K., 3,865,620.

Charlesworth, David Valentine, to Clarke & Smith Manufacturing Company Limited. Braille tape reader. 3,866,020, Cl. 235-61.11D.

Charransol, Pierre; Hauri, Jacques; and Athenes, Claude, to International Standard Electric Corporation. Switching module for a PCM switching system. 3,865,989, Cl. 179-15.0AQ.

Charransol, Pierre; Hauri, Jacques; and Fontana, Serge Robert, to International Standard Electric Corporation. Signal routing device for a parallel transmission and/or switching network of coded signals. 3,865,991, Cl. 179-15.0BF.

Chatfield, John F., Jr. Hydraulically-operated fire extinguishing drill. 3,865,194, Cl. 169-70.000.

Chekmarev, Alexandr Ilich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Chen, Keith A., to Norton-McMurray Manufacturing Company. Compression joint or coupling for pipes. 3,865,410, Cl. 285-31.000.

Chenevey, Edward C.; Druin, Melvin L.; and Oringer, Kenneth, to Celanese Corporation. Synthesis of 3,3'-diaminobenzidine from 3,3'-dichlorobenzidine. 3,865,876, Cl. 260-581.000.

Cherney, Thomas M.; and Knudson, John O., to Minnesota Mining and Manufacturing Company. Component connector. 3,865,460, Cl. 339-98.000.

Chester, Carroll W. Window shade for a vehicle or the like. 3,865,428, Cl. 296-97.00G.

Chestnut, Benjamin F.: *See—*
Underwood, David W.; and Chestnut, Benjamin F., 3,866,002.

Chevalaz, Roger A.: *See—*
Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.

Chevalier, Paul, to Prayfel Inc. Two level random number generator having a controllable expected value. 3,866,029, Cl. 235-152.000.

Chevron Research Company: *See—*
Fries, Bernard A., 3,865,736.
Goldschmidt, Alfred, 3,865,740.
Koundakjian, Theodore H., 3,865,937.

Chiba, Shyozo; Kung, Charles K. H.; and Goldwasser, Eugene, to United States of America, Atomic Energy Commission. Stabilization of urinary erythropoietin using sodium p-aminosalicylate and extracting into phenol. 3,865,801, Cl. 260-112.00R.

Chibata, Ichiro; Tosa, Tetsuya; Sato, Tadashi; and Mori, Takao, to Tanabe Seiyaku Co., Ltd. Blood urea removal device. 3,865,726, Cl. 210-152.000.

Chida, Yoshinori; and Mizutani, Seiki, to Kabushiki Kaisha Seikosha. Printing mechanism automatically positionable in the same start position. 3,865,030, Cl. 101-93.00C.

Chorvat, Robert J.; and Pappo, Raphael, to G. D. Searle & Co. 1,3-Diethers of 2-azaestratrienes and intermediates. 3,865,833, Cl. 260-289.0AZ.

Chrepta, Metro M.: *See—*
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Chrisp, Lynn E., to Chrisp Manufacturing Company. Wire winder. 3,865,328, Cl. 242-71.900.

Chrisp Manufacturing Company: *See—*
Chrisp, Lynn E., 3,865,328.

Christie, George, to General Electric Company. Heat vulcanizable silicone rubber compositions resistant to oil degradation. 3,865,778, Cl. 260-37.0SB.

Christopher, Charles A.; and Allen, Joseph C., to Texaco Inc. Hydraulic fracturing method. 3,865,190, Cl. 166-308.000.

Chrysler Corporation: *See—*
Adams, Don, III, 3,864,988.

Chrysler United Kingdom Limited: *See—*
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Church, Nathan Lewis; and DeBarbadillo, John Joseph, II., to International Nickel Company, Inc., The. Alloy additive. 3,865,582, Cl. 75-122.000.

Chvatal, Milos, to Bernz-O-Matic Corporation. Regulator valve. 3,865,137, Cl. 137-613.000.

Chvejka, Jiri: *See—*
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Ciba-Geigy AG: *See—*
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Stark, John-Hermann; Lambiel, Jean-Claude; and Jungo, Markus, 3,864,962.

Ciba-Geigy Corporation: *See—*
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Ciuffreda, Anthony R.: *See—*
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Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., to Continental Oil Company. Overbased branched chain aliphatic sulfonate waterflood additives. 3,865,735, Cl. 252-8.55D.

Clark Equipment Company: *See—*
Swanson, Allan R., 3,865,205.

Clark, Hal J.; and Wells, Victor S. Lift mechanism for automobiles. 3,865,214, Cl. 187-8.720.

Clark, Thomas B. Pitless water system. 3,865,513, Cl. 417-38.000.

Clarke & Smith Manufacturing Company Limited: *See—*
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Clay, Alvie L.: *See—*
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Clay, Cecil W.; and Clay, Alvie L., to Clay & Clay Enterprises, Inc.; and Clay, Cecil W. Training device for golfers. 3,865,383, Cl. 273-183.00B.

Clay & Clay Enterprises, Inc.: *See—*
Clay, Cecil W.; and Clay, Alvie L., 3,865,383.

Clayman, William, to Charles S. Naiman. Reserve batteries. 3,865,631, Cl. 136-114.000.

Clean Energy, Inc.: *See—*
Nardi, Anthony, 3,865,522.

Clements, Alwin S.: *See—*
Metcalfe, Kenneth A.; and Clements, Alwin S., 3,866,096.

Clements, Ralph E., to Barber-Colman Company. Reversing controller. 3,866,135, Cl. 330-51.000.

Clever, Raymond E.; Hapke, Kenyon A.; and Wells, Thomas R., to Bell & Howell Company. Drive interface system. 3,865,331, Cl. 242-199.000.

Cline, Carl F.; and Morris, Robert C., to Allied Chemical Corporation. Doped beryllium lanthanate crystals. 3,866,142, Cl. 331-94.50F.

Close, Olive H. Weed puller. 3,865,348, Cl. 254-132.000.

Clubley, Michael Hilton: *See—*
Pitts, Frank; and Clubley, Michael Hilton, 3,865,760.

Clutter, Raymond J., to Akzona Incorporated. Flame-retardant polyester. 3,865,783, Cl. 260-45.9NP.

Cobaugh, Robert Franklin; and Coller, James Ray, to AMP Incorporated. Preloaded contact and latchable housing assembly. 3,865,462, Cl. 339-176.00M.

Cohen, David Lionel, to Imperial Chemical Industries Limited. Gravure printing plates. 3,865,590, Cl. 96-38.000.

Cohen, Leopold. Ultrasonic intrusion detection systems employing turbulence discrimination. 3,866,198, Cl. 340-258.00A.

Coherent Radiation Laboratories: *See—*
Hobart, James Lee; and Mefferd, Wayne S., 3,866,140.

Colaluca, Donald M., to Raymond Lee Organization, a part interest. Tape protecting cover device. 3,865,238, Cl. 206-404.000.

Cole, Edgar C. Instructional apparatus for underwater welding. 3,866,011, Cl. 219-72.000.

Cole, Edward L.: *See—*
McCoy, Frederic C.; and Cole, Edward L., 3,865,896.

Coleman Company, The: *See—*
Blossom, Armond L., 3,865,182.

Coleman, Kenneth L. Collapsible material handling and storage container. 3,865,269, Cl. 220-6.000.

Coles, Alan V., to Textron, Inc. Attachment for air cushion confining inflatable trunk structures to air cushion supported vehicles. 3,865,332, Cl. 244-102.00R.

Coles, Donald K. Keyboard type musical instrument. 3,865,004, Cl. 84-423.000.

Collaborative Research, Inc.: *See—*
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Coller, James Ray: *See—*
Cobaugh, Robert Franklin; and Coller, James Ray, 3,865,462.

Collins Radio Company: *See—*
Sather, Delaine C.; and Lutz, Bruce C., 3,866,213.

Collins, Samuel C., to Cryogenic Technology, Inc. Apparatus for liquefying a cryogen by isentropic expansion. 3,864,926, Cl. 62-38.000.

Colucci, Stephen L.: *See—*
Vopat, Frank E.; and Colucci, Stephen L., 3,864,778.

Combustion Engineering, Inc.: *See—*
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Commonwealth of Australia Care of the Secretary Department of Supply, The: *See—*
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Compagnie d'Applications Mecaniques a l'Electronique au Cinema et a l'Atomistique (C.A.M.E.C.A.): *See—*
Vastel, Jean, 3,866,042.
Condolios, Elie; and Essen, Uilke Van, to N.V. Technische Maatschappij Bergmann; and Societe Grenobloise d'Etudes et d'Applications Hydrauliques. Method for separating particles from a liquid. 3,865,725, Cl. 210-73.000.
Conner, Jack S.: *See—*
Benneche, Chris; Brochu James W.; and Conner, Jack S., 3,866,226.
Connick, Francis Glenn, to Swift & Company. Pickle manufacturing. 3,865,351, Cl. 259-4.000.
Conrad, Raymond W.: *See—*
Ely, Richard E.; and Conrad, Raymond W., 3,866,045.
Consolidated Brass Company: *See—*
Mullis, Jerry D., 3,865,130.
Container Corporation of America: *See—*
Hamlin, John R., 3,865,233.
Contemporary, Inc.: *See—*
Kanzelberger, James C., 3,865,342.
Continental Carbon Company: *See—*
Thomson, Ely Knox, 3,865,280.
Continental Oil Company: *See—*
Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., 3,865,735.
Gordon, Ronnie D., 3,865,887.
Haden, Elard L., 3,865,201.
Kemp, Paul Clifford, 3,865,737.
Control Data Corporation: *See—*
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Van Mourik, Cornelis, 3,866,146.
Control Networks Corporation: *See—*
Hestad, Alfred, 3,865,978.
Cooke, Brian Alfred, to Imperial Chemical Industries Limited. Concentration and coating processes. 3,865,706, Cl. 204-181.000.
Coop, Jack A. Tear-off cap closure. 3,865,268, Cl. 215-253.000.
Cooper, Julius; and Reinertsen, Tormod K., to Ideal Toy Corporation. Shuffleboard type game. 3,865,377, Cl. 273-126.00R.
Cooper, Robert P. Grain drying process and system and apparatus therefor. 3,864,845, Cl. 34-171.000.
Cooperatieve Condensfabriek "FRIESLAND": *See—*
Lecluse, Willem Jan, 3,865,959.
Copeland, John S.: *See—*
Miles, William B.; and Copeland, John S., 3,865,486.
Copithorne, Alton R., to Boston Machine Works Co. Adaptor to enable coating machine to accomodate shoe sole or the like of irregular thickness. 3,865,077, Cl. 118-250.000.
Coppage, Thomas B.; Flier, Ronald J.; and Payne, Bernard M., to Ralston Purina Company. Expanded protein lattice food product and method of making. 3,865,966, Cl. 426-372.000.
Cordier, Paul; Jung, Louis; and Hug, Raymond. Process for the preparation of dihydrometoxazinone derivatives and products so obtained. 3,865,821, Cl. 260-244.00R.
Corneel, Roevens Leopold Frans: *See—*
Van Gelder, Josephus Ludovicus Hubertus; Raeymaekers, Alfons Herman Margaretha; Corneel, Roevens Leopold Frans; and Van Laerhoven, Willy Joannes, 3,865,836.
Cornelissen, Barnardo Henricus Jozef, to U.S. Philips Corporation. Device for the digital subtraction of frequencies. 3,866,129, Cl. 328-133.000.
Cornelissen, Gerardus Antonius Petrus Maria; Rijpers, Johannes Cornelis Norbertus; and Siebers, Gerardus Henricus Maria, to U.S. Philips Corporation. Device for coating a wire of an electrically conducting material continuously from the gas phase. 3,865,074, Cl. 118-49.500.
Cornelius Company, The: *See—*
Holcomb, Donald E., 3,865,134.
Corns, Joseph B.: *See—*
Ridgway, John A., Jr.; Lappin, Terry A.; Benjamin, Benny Moses; Corns, Joseph B.; and Akin, Cavit, 3,865,691.
Cosgrove, Clarence E., to Raymond Lee Organization, Inc., The, a part interest. Outdoor game including tubular hoop structure and plurality of balls. 3,865,375, Cl. 273-118.00R.
Coty, Donald J. Viscous fluid clutch. 3,865,221, Cl. 192-58.00B.
Coulter Electronic, Inc.: *See—*
Ginsberg, Guenter, 3,865,069.
Coulter Electronics, Inc.: *See—*
Figueroa, David R., 3,866,131.
Counceller, John D.: *See—*
Burpulis, John Samuel; Souffie, Robert David; Counceller, John D.; and De Capite, Robert, 3,865,354.
Coval, Arthur B. Articulated haulage vehicle. 3,865,206, Cl. 180-24.000.
Cox, Roger Douglas; and Michaels, Walter Bernard, to Globe-Union Inc. Screen tensioning apparatus. 3,865,154, Cl. 140-109.000.
Cozewith, Charles: *See—*
Tornqvist, Erik G. M.; and Cozewith, Charles, 3,865,749.
Crabtree, Kenneth L., to Keyes Fibre Company. Egg carton with flexible window well. 3,865,299, Cl. 229-2.500.
Cramer, Roy A., Jr. Floatation aerator for aerating and moving water. 3,865,909, Cl. 261-91.000.
Crawford, Daniel A.: *See—*
Kerscher, William J., III; and Crawford, Daniel A., 3,866,166.
Crawshay, Richard; and Hradil, John Helmut, to Canadian Mine Services Ltd. Hydraulic drive apparatus for wheeled vehicle. 3,865,208, Cl. 180-6.480.
Cricchio, Renato; and Lancini, Giancarlo, to Gruppo Lepetit S.p.A. 3-Acylhydrazonomethyl rifamycins. 3,865,812, Cl. 260-239.30P.
Crimes, Peter B.: *See—*
Neumann, Norbert F.; and Crimes, Peter B., 3,865,573.
Crocker Country Day School, Inc.: *See—*
Welmecke, August Philip, 3,864,850.
Cronauer, Donald C.; and Baumgard, Larry G., to Borg-Warner Corporation. Oxidation of methylated benzenes. 3,865,870, Cl. 260-524.00R.
Crooke, Arthur W., to Sperry Rand Corporation. Multiplicative signal processor for target detection systems with sequential doppler search. 3,866,223, Cl. 343-17.2PC.
Crosby, Melvin A., to Kennametal Inc. Rotary mining tool retaining structure. 3,865,437, Cl. 299-86.000.
Cross Newform Plastics Co., Inc.: *See—*
Sperling, Charles A., 3,865,290.
Crouzet, Jean Claude: *See—*
Repiquet, Gerard; and Crouzet, Jean Claude, 3,865,762.
Crow, Gerald W. Method and apparatus for separating wood bark from gravel. 3,865,241, Cl. 209-11.000.
Crucible Inc.: *See—*
Buehl, Russell C., 3,865,174.
Cryogenic Technology, Inc.: *See—*
Collins, Samuel C., 3,864,926.
Cullen, Clifford Frank, to Vickers Ruwolt Pty. Ltd. Chain link. 3,864,906, Cl. 59-84.000.
Cunniff, John G.: *See—*
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,865,698.
Cunningham, James T.: *See—*
Koenig, William E.; and Cunningham, James T., 3,865,232.
Cupp, Calvin Robert: *See—*
Fisher, Gordon Lloyd; and Cupp, Calvin Robert, 3,865,572.
Curran, Edward T., to United States of America, Air Force. Step cylinder combustor design. 3,864,907, Cl. 60-261.000.
Currie, George D., to United States of America, Air Force. Apparatus for laser frequency selection. 3,866,139, Cl. 331-94.50C.
Currier-Smith Corporation: *See—*
Bennett, Victor A., Jr., 3,866,217.
Curtis, Milton E. Parlimentary procedure sign. 3,866,211, Cl. 340-332.000.
Curto, Paul A., to United States of America, Army. Fluidic oscillator having a sting mounted in a resonant cavity. 3,865,143, Cl. 137-826.000.
Cushman, Walton W. Transportation system. 3,865,039, Cl. 104-18.000.
Cutler, Earl F., to Cutter Repaving Associates, Incorporated. Heater for asphalt concrete roadways and the like. 3,865,098, Cl. 126-271.20A.
Cutler, Hymie; and Vadasy, Donald, to Bendix Corporation, The. Digital tool size compensation for numerical control. 3,866,027, Cl. 235-151.110.
Cutter Laboratories, Inc.: *See—*
Von Alven, Raymond D., 3,865,339.
Cutter Repaving Associates, Incorporated: *See—*
Cutler, Earl F., 3,865,098.
Cuvelier, Michel, to Elphiac. Water jet device for induction heaters. 3,866,010, Cl. 219-10.570.
Dabbs, Everett E. Foot drying apparatus. 3,865,122, Cl. 132-73.000.
Daborowski, Ignace J.: *See—*
Bostwick, Norvan W.; and Daborowski, Ignace J., 3,865,091.
Dadura, James G.: *See—*
Haugen, Haakon; and Dadura, James G., 3,865,810.
DaGragnano, Victor L.: *See—*
Schontzler, James G.; Gates, Wendall C.; and DaGragnano, Victor L., 3,866,028.
Dai Nippon Printing Co., Ltd.: *See—*
Ohto, Michihiro; Noshiro, Atsumi; Mayuzumi, Tetsuya; and Fujino, Toji, 3,865,588.
Daido Metal Company, Ltd.: *See—*
Morisaki, Nobukazu, 3,864,835.
Daigle, Donald J.; Pepperman, Armand B., Jr.; and Normand, Floyd L., to United States of America, Agriculture. Increasing flame retardance of cellulose textile with 1,3,7-triaza-5-phosphabicyclo(3.3.1)nonane-3,7-dicarbonitrile. 3,865,618, Cl. 117-136.000.
Daiichi Seiyaku Co., Ltd.: *See—*
Hirayama, Tadamasa; and Nakagawa, Kiyoshi, 3,865,825.
Daiwa Machinery Works, Ltd.: *See—*
Domoto, Akira, 3,864,948.
Dalisa, Andrew Lawrence: *See—*
Dougherty, Joseph Patrick; Dalisa, Andrew Lawrence; and Seymour, Robert John, 3,866,187.
Danford, Jack: *See—*
Danford, Jack De Wayne, 3,865,056.
Danford, Jack De Wayne, to Danford, Jack; and Champlin, H. H. Sewage disposal system and apparatus. 3,865,056, Cl. 111-7.000.
Danfoss A/S: *See—*
De Lepeleire, Guido Amandus, 3,865,021.
Sjotun, Kyrre G., 3,865,518.
Dankoff, Joseph Daniel; and Snyder, David Kent. Reclamation of components from grinding swarf. 3,865,629, Cl. 134-19.000.

Danusso, Ferdinando: *See—*
Marchisio, Maria Antonietta; Ferruti, Paolo; Longo, Tito; and Danusso, Ferdinando, 3,865,723.

Dart Industries Inc.: *See—*
Gaylord, Norman G., 3,865,788.
Hulyalkar, Ramchandra K., 3,865,772.
Ludwig, Jerome H.; and Dieckmann, Dale J., 3,865,787.

Darwood, James R., to T.A.D. Avanti, Inc. Voice operated electric circuit. 3,865,986, Cl. 179-6.00R.

Data Products Corporation: *See—*
Lytle, Dan R., 3,865,029.

Datascope Corporation: *See—*
Saper, Lawrence; Heller, George; and Hitchcoff, David, 3,865,101.

Datta, Ranajit K.; and Luscher, Thomas, to General Electric Company. Color rendition of high pressure mercury vapor lamp. 3,866,083, Cl. 313-487.000.

Davidson, William H.: *See—*
Lovitz, David D.; Eastman, Ness; and Davidson, William H., 3,865,082.

Davies, Hilary E. W., to LKB-Produkter AB. Electrode arrangement for an electrophoretical separation performed in a gel plate. 3,865,712, Cl. 204-299.000.

Davis, Dale M., to United States of America, Air Force. High lethality shrapnel projectile. 3,865,036, Cl. 102-67.000.

Davis, Walter L.; and Svehaug, Henry V., to Key Equipment Company. Method for cooling food in a fluidized bed. 3,865,965, Cl. 426-519.000.

Davison, Robert W. Aqueous paper size composition containing hydrocarbon resin and fortified rosin. 3,865,769, Cl. 260-27.00R.

DBM Industries Ltd.: *See—*
Caroli, Italo, 3,865,359.

Dean, Carl J.; and Wright, David M., to Barry Wright Corporation. Hanging binder. 3,865,445, Cl. 312-184.000.

DeBarbadillo, John Joseph, II.: *See—*
Church, Nathan Lewis; and DeBarbadillo, John Joseph, II., 3,865,582.

Debloois, Roger C.; and Hogue, Noel E., to Rockwell International Corporation. Digital frequency-phase discriminator circuit. 3,866,133, Cl. 329-104.000.

De Capite, Robert: *See—*
Burpulis, John Samuel; Souffie, Robert David; Counceller, John D.; and De Capite, Robert, 3,865,354.

DeCaprio, Joseph Donald; Haylock, John Christopher; and Lofquist, Robert Allen, to Allied Chemical Corporation. Cationic dyeable nylon 6 containing alkaline metal salts of poly (2-methyl-2-(1-oxo-2-propenyl) amino) -1-propanesulfonic acid. 3,865,900, Cl. 260-857.0UN.

De Couvreur, Gilbert; and Pastor, Marc, to Universite de Sherbrooke. Balanced correlated ternary coding system. 3,866,147, Cl. 332-11.00R.

Deere & Company: *See—*
Von Fummetti, Cyril William; and Dennis, David, 3,865,210.

DeGiorgio, John A.; Labib, Ahmed H.; and Rane, Subhash R., to Solid State Technology, Inc. Emergency signalling system having manually operated generator. 3,866,206, Cl. 340-298.000.

DeGrange, Wallace L., Jr.: *See—*
McCormack, Leonard J.; and DeGrange, Wallace L., Jr., 3,865,285.

De Howitt, Jack Renato; Jonkoff, Imre Mirko; and Stoveken, Robert Ernest, to du Pont de Nemours, E. I., and Company. Foam finish applicator. 3,865,078, Cl. 118-612.000.

de Jonge, Frederik Ate; Druijvesteijn, Willem Frederik; Verhulst, Antonius Gerardus Hendrikus; and Enz, Ulrich Ernst, to U.S. Philips Corporation. Magnetic domain propagation device. 3,866,190, Cl. 340-174.0TF.

De Klerk, Jacobus Johannes Maria Joseph: *See—*
Hasker, Jan; and De Klerk, Jacobus Johannes Maria Joseph, 3,866,081.

Delany, Harold Edward. Invalids aids. 3,865,427, Cl. 296-68.000.

Delaware Photographic Products, Inc.: *See—*
Katz, Jerome, 3,865,591.

De Lepeleire, Guido Amandus, to Danfoss A/S. Air injecting apparatus for air conditioners or the like. 3,865,021, Cl. 98-40.00C.

Delery, Marc, to S.A. Francois Salomon & Fils. Safety binding for skis. 3,865,389, Cl. 280-11.35N.

Delgendre, Jacques Claude; Kerreneur, Alain Roger; and Berton, Georges Albert, to Etat Francaise Delegation Ministerielle pour l'Armement. Pyrotechnical composition static relays. 3,865,037, Cl. 102-70.20R.

Della-Porta, Clifford Anthony. Snare drum. 3,865,003, Cl. 84-411.000.

Del Rio, Eddy Humberto, to RCA Corporation. Fingerprint display system utilizing a stored fingerprint. 3,865,488, Cl. 356-71.000.

DeMarinis, Robert M.; and Hoover, John R. E., to SmithKline Corporation. Substituted sulfonylacetamido cephalosporins. 3,865,819, Cl. 260-243.00C.

De Mieri, Peter, to Raymond Lee Organization, Inc., The. Combined feeding and teething device for infants. 3,865,115, Cl. 128-359.000.

deMontigny, Armand: *See—*
Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, 3,865,858.

Demos, Gary A.; and Ruhoff, David S. Selective audio signal frequency multiplier. 3,866,127, Cl. 328-38.000.

Demoute, Jean-Pierre: *See—*
Hainaut, Daniel; Toromanoff, Edmond; and Demoute, Jean-Pierre, 3,865,854.

Demuth, Hans, to Sulzer Brothers Limited. Braking device for a shuttle in a weaving machine. 3,865,150, Cl. 139-185.000.

Den-Tal-Ez Mfg., Co.: *See—*
Fortnam, George A.; and Sams, Ivan E., 3,865,341.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Horlle, Shigeki; Fujii, Chiyuki; and Kosai, Yoshio, 3,865,882.

Dennis, David: *See—*
Von Fummetti, Cyril William; and Dennis, David, 3,865,210.

Dennis, Roy James; and Kielpikowski, Klemence, to Roy James Dennis. Anchor boom. 3,865,065, Cl. 114-210.000.

De Nunzio, Anthony, to Raymond Lee Organization, Inc., The. Apparatus for operating an aerosol can. 3,865,275, Cl. 222-70.000.

DePaola, John J.; and Morse, Charles W., to General Signal Corporation. Automatic switching control system for railway classification yards. 3,865,042, Cl. 104-26.00B.

De Poister, David C., to Foster Wheeler Corporation. Inner furnace air chamber. 3,865,084, Cl. 122-235.00B.

Deprez, Thomas A.; and Whalley, Frank M., to Gleason Works, The. Means for securing and removing molds from compacting apparatus. 3,865,533, Cl. 425-405.00H.

Dera, Alain: *See—*
Lombard, Claude; and Dera, Alain, 3,865,312.

Dermott, Raymond W., to Schlumberger Technology Corporation. Apparatus for perforating sub-sea well bores. 3,865,199, Cl. 175-4.510.

Desimone, David N., to United States of America, Navy. Adjustable earmuffs. 3,864,756, Cl. 2-6.000.

DeSoto, Inc.: *See—*
Sekmakas, Kazys, 3,865,771.

Desvignes, Francois; Hybois, Raymond; and Lebrun, Dean, to U.S. Philips Corporation. Device for digital detection of optical radiation. 3,866,046, Cl. 250-338.000.

Deters, Elmer M., to Weil-McLain Co., Inc. Control apparatus for a water supply system. 3,865,512, Cl. 417-26.000.

Detert, Ernst-Rolf; and Buchholz, Willi, to Edward Gerlach G.m.b.H. Process for producing tobacco foils. 3,865,120, Cl. 131-140.00C.

DeTorre, Robert P., to Molins Limited. Method of pseudosubsurface scoring and cutting glass sheets and sheet cut thereby. 3,865,673, Cl. 161-1.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Hebbel, Gerhard; Kruger, Horst; Traser, Werner; and Pfand, Herbert, 3,865,685.
Reber, Rudi; and Herzog, Robert, 3,866,158.

Deutsche Texaco Aktiengesellschaft: *See—*
Neier, Wilhelm; Lindstadt, Hans-Jurgen; and Webers, Werner, 3,865,606.

de Vivy, Dominique le Febve, to Sulzer Brothers Limited. Enthalpy calculating device for steam. 3,866,026, Cl. 235-151.100.

deVries, Edward R., to Unifilm Corporation. Flatting compositions. 3,865,899, Cl. 260-841.000.

Dial, Darrell D.; and von Bose, Robert J., to Halliburton Company. Sealed cushioning unit. 3,864,922, Cl. 61-48.000.

Diamond Shamrock Corporation: *See—*
Schenker, Barry A.; Kolb, James M.; and Franks, Charles R., 3,865,703.

Dieckmann, Dale J.: *See—*
Ludwig, Jerome H.; and Dieckmann, Dale J., 3,865,787.

Diehn, Philip H., to Wheelabrator-Frye, Inc. Fixture for a blast cleaning machine. 3,864,876, Cl. 51-9.00M.

Diener, Horst; Lenhart, Helga; and Seifried, Walter, to Hoechst Aktiengesellschaft. Polyester film of high strength and low electrical surface resistance. 3,865,626, Cl. 117-226.000.

Di Gregorio, Joseph S.: *See—*
Titus, Paul E.; and Di Gregorio, Joseph S., 3,865,547.

Dillman, Thayer L.: *See—*
Mann, August C.; and Dillman, Thayer L., 3,866,196.

DiMarco, Bernard; and Kralik, Andrew J. Overload relay indicating means. 3,866,156, Cl. 337-79.000.

Di Matteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., to Dynell Electronics Corporation. Methods for generating signals defining three-dimensional object surfaces. 3,866,052, Cl. 250-558.000.

Dixie Type and Supply Co.: *See—*
Stafford, Eugene T., 3,865,000.

Dobinson, Bryan; and Winterbottom, Kenneth, to Ciba-Geigy AG. Treatment of fibrous materials. 3,865,621, Cl. 117-141.000.

Dr. W. Kampschulte & Cie: *See—*
Immel, Waldemar; and Strauss, Wennemar, 3,865,702.

Doggett, Glenn O.; and Hallmark, Bobby Joe, to Gearhart-Owen Industries, Inc. Method and apparatus for selectively isolating a zone of subterranean formation adjacent a well. 3,865,188, Cl. 166-285.000.

Dohnalek, Rudolf: *See—*
Masat, Jan; Dohnalek, Rudolf; and Chvejka, Jiri, 3,865,553.

Dohr, Manfred; Zeidler, Ulrich; and Lepper, Herbert, to Henkel & Cie. GmbH. Process for the preparation of carboxylic acids from vicinal diols. 3,865,856, Cl. 260-413.000.

Dola, Frank Peter, to AMP Incorporated. Cover plate for electrical outlet. 3,865,456, Cl. 339-40.000.

Doll, Brendan L., to Cellu Products Company. Apparatus for forming slitting roll. 3,864,877, Cl. 51-34.00F.

Domoto, Akira, to Daiwa Machinery Works, Ltd. Suction drum washer. 3,864,948, Cl. 68-184.000.

Dompas, John Mary-Anthony; and Hazelett, Robert William, to Hazelett Strip-Casting Corporation. Casting method for twin-belt continuous metal casting machines. 3,865,176, Cl. 164-87.000.

Domtar Limited: *See—*
Brooks, William Victor Hayes, 3,865,111.

Donachie, Stephen James, to International Nickel Company, Inc., The. Process of producing by powder metallurgy techniques a ferritic hot forging of low flow stress. 3,864,809, Cl. 29-420.500.

Donnel, Roscoe J.: *See—*
McCrobie, George L.; and Donnel, Roscoe J., 3,865,470.

Donovan, Robert W.; Kolster, Harvey L.; Broeker, Herbert H.; and Bailey, George W., to Hallmark Cards, Incorporated. Wall mounted display system. 3,865,248, Cl. 211-90.000.

Dorrough, Vernon R.; and Brown, Claude H., to Jet Research Center, Inc. Method of boring through hard rock formations. 3,865,436, Cl. 299-13.000.

Doser, Manfred, to General Electric Company. Method of deforming sintered magnets without significantly reducing magnetic properties. 3,864,808, Cl. 29-420.500.

Dossier, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). One-way drive rotary couplings, especially mechanisms of the free wheel type. 3,865,219, Cl. 192-45.100.

Dougherty, Joseph Patrick; Dalisa, Andrew Lawrence; and Seymour, Robert John, to North American Philips Corporation. Method of recording and reproducing information in ferroelastic metals. 3,866,187, Cl. 340-173.00R.

Dow Chemical Company, The: *See—*
Flynn, James P., 3,865,657.
Flynn, James P., 3,865,658.
Flynn, James P.; Lane, George A.; and Plomer, John J., 3,865,659.
Goralski, Christian T.; and Klingler, Thomas C., 3,865,822.
Knodel, Louis Robert, 3,865,806.
Reigler, Paul F.; and Lamoria, Lz F., 3,865,928.
Small, Hamish, 3,865,717.
Tveter, Elmer C., deceased; Harris, Guy H.; and Lindy, Lowell B., 3,865,718.

Dow Chemical Corporation: *See—*
Keil, Joseph W., 3,865,544.

Dow Corning Corporation: *See—*
Abbott, Eugene A.; Isquith, Alan J.; and Walters, Patrick A., 3,865,728.
Falender, James R.; Lindsey, Sarah E.; and Saam, John C., 3,865,897.

Drake, Daniel H. Saliva ejector. 3,864,831, Cl. 32-33.000.

Dreitzler, David R.; Moore, Charles R.; and Thorn, Lawrence B., to United States of America, Army. Direct display of thermal conductivity profile for non-destructive testing of insulated rocket motor cases. 3,864,958, Cl. 73-15.00R.

Drelich, Arthur H.; and Bowman, Bobby R., to Johnson & Johnson. Resin binder compositions. 3,865,764, Cl. 260-17.00R.

Drelich, Arthur H.; and Bowman, Bobby R., to Johnson & Johnson. Resin binder compositions. 3,865,765, Cl. 260-17.4ST.

Drelich, Arthur H.; and Bowman, Bobby R., to Johnson & Johnson. Resin binder compositions. 3,865,775, Cl. 260-29.70M.

Drostholm, Frede Hilmar; and Meyer, Leonard S., to Drostholm, Frede Hilmar. Apparatus for manufacturing pipes. 3,865,526, Cl. 425-140.000.

Druijvesteijn, Willem Frederik: *See—*
de Jonge, Frederik Ate; Druijvesteijn, Willem Frederik; Verhulst, Antonius Gerardus Hendrikus; and Enz, Ulrich Ernst, 3,866,190.

Druin, Melvin L.: *See—*
Chenevey, Edward C.; Druin, Melvin L.; and Oringer, Kenneth, 3,865,876.

Drummond, Frederick Charles, to Borg-Warner (Australia) Limited. Multiple spring assembly. 3,865,357, Cl. 267-91.000.

Dry, Clinton H. Pest control package. 3,864,867, Cl. 43-131.000.

Dubno, Abraham M.: *See—*
Dubno, Richard C.; and Dubno, Abraham M., 3,865,027.

Dubno, Richard C.; and Dubno, Abraham M. Hand grenade with safety mechanism. 3,865,027, Cl. 102-64.000.

Duescher, Margie F., to FisHair Incorporated. Fishing lure component. 3,864,864, Cl. 43-42.250.

Duke, James C.: *See—*
Terhune, Ralph D.; and Duke, James C., 3,865,732.

Duling, Irl N.; and Merges, John C., Jr., to Sun Research and Development Co. Porous polyethylene sheet. 3,865,674, Cl. 161-6.000.

Dumoulin, Jean, to Rhone-Poulenc S.A. Aqueous dispersion of (1) organopolysiloxane and (2) allyl alcohol—acrylamide copolymer as paper coating. 3,865,773, Cl. 260-29.6NR.

Dunkerley, Kenneth; and Kenyon, Ronald Wynford, to Imperial Chemical Industries Limited. Manufacture of anthraquinone compounds. 3,865,851, Cl. 260-280.000.

Dunkin, Albert. Punchpress feed mechanism. 3,864,950, Cl. 72-6.000.

Dunlop Limited: *See—*
Gebert, Karl, 3,865,167.
Mitchell, William E., 3,865,170.

Dunn, John William, to Owens-Corning Fiberglas Corporation. Apparatus for coating three dimensional objects. 3,865,525, Cl. 425-60.000.

Dunn, Wendell E., Jr., to Rutile & Zircon Mines (Newcastle) Limited. Process for beneficiating a titaniferous ore and production of chlorine and iron oxide. 3,865,920, Cl. 423-74.000.

Dunphy, Matthew J., to Pyrotector, Incorporated. Fire detection and extinguishing system. 3,865,192, Cl. 169-61.000.

du Pont de Nemours, E. I., and Company: *See—*
Berg, Quentin, deceased; and , 3,865,455.
Blackwell, John; and Fendglis, Richard A., 3,865,804.
Bruce, John MacMillan, Jr., 3,865,885.
Burpulis, John Samuel; Souffie, Robert David; Counceller, John D.; and De Capite, Robert, 3,865,354.
Charles, John Frederick; and Markovchik, Carl Joseph, 3,864,999.
De Howitt, Jack Renato; Jonkoff, Imre Mirko; and Stoveken, Robert Ernest, 3,865,078.
Freeman, John Thomas; Heiart, Robert Bernard; and Leberzammer, Ernst, 3,865,589.
Hartstein, Eugene Fredrick; and Kendall, Ross Edward, 3,865,316.
Kane, William P., 3,865,302.
Monroe, Elmer S., Jr., 3,865,054.
Musser, Michael T.; and Streitwieser, Andrew, Jr., 3,865,865.
Wolf, William Edward, 3,866,054.

Du Shane, Harold P. Persistence of vision, subliminal spot light. 3,865,790, Cl. 240-49.000.

Dutton, Lawrence D., to Truck Specialist Inc. Quick change hitch for trailer or mobile homes. 3,865,406, Cl. 280-490.00R.

Duval, Denise Jeanne Claude: *See—*
Robba, Max Fernand; and Duval, Denise Jeanne Claude, 3,865,842.

Dyer, Clarence H.: *See—*
Kellams, Roger W.; and Dyer, Clarence H., 3,865,079.

Dylaker Computer Systems, Inc.: *See—*
Newcomer, William P., Jr., 3,865,325.

Dymo Industries Inc.: *See—*
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Dynell Electronics Corporation: *See—*
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E. O. Schweitzer Manufacturing Co., Inc.: *See—*
Schweitzer, Edmund O., Jr., 3,866,197.

E. R. Squibb & Sons, Inc.: *See—*
Krapcho, John; and Turk, Chester F., 3,865,818.

Eagle Electric Mgf. Co. Inc.: *See—*
Ludwig, Melvin, 3,865,461.

Earle Gear and Machine Company, The: *See—*
Perkons, George; and Schailey, Orrell B., 3,864,777.

Earle, Roland D. Method for providing a continuous film of algin containing coating material surrounding a raw onion product. 3,865,962, Cl. 426-291.000.

Eash, Robert E.; and Burkart, Robert C., to Farlow Associates Inc. Apparatus and a method for final assembling of dynamoelectric machines. 3,864,822, Cl. 29-598.000.

East Penn Mfg. Co., Inc.: *See—*
Bowers, Bernard P.; and Breidegam, Delight E., Jr., 3,865,419.

Eastman Kodak Company: *See—*
Krutak, James J., Sr., 3,865,837.

Eastman, Ness: *See—*
Lovitz, David D.; Eastman, Ness; and Davidson, William H., 3,865,082.

Eau Claire, Thomas J. Means for putting additive in plastic and other materials. 3,865,355, Cl. 259-192.000.

Eber, Nicolas: *See—*
Asher, Amram; and Eber, Nicolas, 3,864,937.

Eberhard, Hans-Joachim; Overlach, Knud; Huhne, Gerd; and Pietzsch, Ludwig, to Pietzsch, Ludwig. Device for scanning a function and method of operating the same. 3,866,199, Cl. 340-267.00C.

Eberspacher, J.: *See—*
Reuter, Fritz; and Jung, Horst, 3,865,306.

Edelstahlwerk Witten Aktiengesellschaft: *See—*
Rademacher, Leo, 3,865,585.

Edmonds, James T., Jr.: *See—*
Scoggins, Lacey E.; and Edmonds, James T., Jr., 3,865,794.

Educational Computer Corporation: *See—*
Frye, George L., Jr.; and Gibson, Herman B., Jr., 3,865,479.

Edward Gerlach G.m.b.H: *See—*
Detert, Ernst-Rolf; and Buchholz, Willi, 3,865,120.

Edwards Company Inc.: *See—*
Berns, Charles, 3,866,203.

Edwards, John A.; and Fried, John H., to Syntex Corporation. 1,2,3,4,-9,12-Hexahydrophenanthrenes. 3,865,883, Cl. 260-613.00R.

Efdyn Corporation: *See—*
Gryglas, Bogdan R., 3,865,216.

EGYT Gyogyszervegyeszeti Gyar: *See—*
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Ehlig, William Hollis. Hydrogen fluoride recovery process. 3,865,929, Cl. 423-488.000.

Eibe, Werner W.; and Andrascik, Andrew, to Blaw-Knox Foundry & Mill Machinery, Inc. Roll changers. 3,864,954, Cl. 72-238.000.

Eibe, Werner W., to Blaw-Knox Foundry & Mill Machinery, Inc. Rolling mill stand. 3,864,955, Cl. 72-238.000.

Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, to May & Baker Limited. Treatment of helminth infections with substituted phenyl-thioureas. 3,865,948, Cl. 424-300.000.

Eichler, Dieter; Glockler, Otto; and Bertsch, Richard, to Robert Bosch, G.m.b.H. Method and system to reduce polluting emission from internal combustion engines. 3,865,089, Cl. 123-117.00R.

Eigenbrod, Lester Kurt, to Union Carbide Corporation. All-attitude cryogenic vapor vent system. 3,864,928, Cl. 62-50.000.

Eiglmeier, Kurt, to Hoechst Aktiengesellschaft. Process for the preparation of peri-indenones. 3,865,879, Cl. 260-590.000.

Elebracht, Gunter; and Siekmann, Gunter, to Rheinstahl AG. Reactor for catalytic gas phase oxidation. 3,865,555, Cl. 23-288.00R.

Electronic Associates Inc.: *See—*
Krenzel, Ronald W., 3,864,967.

Electrostatic Equipment Corporation: *See—*
Goodridge, William C.; Gillette, Donald J.; English, William P.; and Minckler, G. Mark, 3,865,610.

Elektrophysikalische Anstalt Bernhard Berhaus: *See—*
Rordorf, Horst, 3,865,451.

Eliner, Alexandr Solomonovich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Elkins, Christopher W.; and Ruehmann, Donald W., to Teledyne Industries, Inc.; and Teledyne Aqua Tec Company. Bracket assembly for hand-held showerhead. 3,865,310, Cl. 239-283.000.

Elliott Brothers (London) Limited: *See—*
Ellis, Stafford Malcolm, 3,865,340.

Ellis, Stafford Malcolm, to Elliott Brothers (London) Limited. Support apparatus. 3,865,340, Cl. 248-399.000.

Elmo Co. Ltd.: *See—*
Aoki, Chihiro; and Sakai, Hiromichi, 3,865,474.

Elmore, Austin E.; and Uhlmann, Ernest A. Colostomy fecal pouch venting means. 3,865,109, Cl. 128-283.000.

Elphiac: *See—*
Cuvelier, Michel, 3,866,010.

Elser, Wilhelm: *See—*
Klein-Doepke, Wolfgang; Elser, Wilhelm; Quis, Peter; and Rossberg, Peter, 3,865,901.

Elsner, Norbert E.; Perry, Louis W., Jr.; Emken, Michael R.; and Steeger, Elmer J., to United States of America, Atomic Energy Commission. Terminal for thermoelectric element. 3,865,632, Cl. 136-237.000.

Elson, Jesse M. Apparatus for improved shipping of crude oil relative to environment damage and ecological problems. 3,864,935, Cl. 62-356.000.

Ely, Richard E.; and Conrad, Raymond W., to United States of America, Army. Night vision device. 3,866,045, Cl. 250-331.000.

Embling, Clifford Arthur; Harrison, Alban; and Hawkes, Arthur Alfred, to Smith Industries Limited. Radar and like echo-display apparatus. 3,866,220, Cl. 343-5.0ST.

EMI Limited: *See—*
Hounsfield, Godfrey Newbold, 3,866,047.

Emken, Michael R.: *See—*
Elsner, Norbert E.; Perry, Louis W., Jr.; Emken, Michael R.; and Steeger, Elmer J., 3,865,632.

Emura, Tokumatsu; Kawabata, Shigeo; and Shimoma, Takashi, to Nippon Kokan Kabushiki Kaisha. Apparatus for detecting the condition of an opaque band-shaped material travelling on a delivery system. 3,866,053, Cl. 250-561.000.

Engelhardt, Friedrich: *See—*
Schnee, Karl; Tichy, Dieter; and Engelhardt, Friedrich, 3,865,683.

Engler, Christoph, to Gesellschaft Zur Forderung Der Forschung un Der EIDG. Techn. Method for the continuous testing of long components for leakage, and system for performance thereof. 3,866,040, Cl. 250-281.000.

Englert, Thomas A.: *See—*
Ardezzone, Frank J.; and Englert, Thomas A., 3,866,119.

English, William P.: *See—*
Goodridge, William C.; Gillette, Donald J.; English, William P.; and Minckler, G. Mark, 3,865,610.

Envirotech Corporation: *See—*
Stephens, Thomas M., 3,864,978.

Enz, Ulrich Ernst: *See—*
de Jonge, Frederik Ate; Druijvesteijn, Willem Frederik; Verhulst, Antonius Gerardus Hendrikus; and Enz, Ulrich Ernst, 3,866,190.

Epner, Elliot J.; Kitchin, Oscar G.; and Sampatacos, Peter M., to General Motors Corporation. Sheet metal steering knuckle with integral steering arm. 3,865,394, Cl. 280-96.100.

Epstein, Barry M., to Action Communications Systems, Inc. Acoustic coupler system for use with common carrier communication lines. 3,865,983, Cl. 179-2.0DP.

Erba, Giancarlo; and Arsizio, Busto, to Officina Meccanica Erba & C. Soc. Acc. Semplice. Device to selectively control the expellers of automatic machines to punch cardboard sheets or the like. 3,865,020, Cl. 93-36.00A.

Ercole Marelli & C. S.p.A.: *See—*
Ruggeri, Luigi, 3,866,110.

Erdelyi Nee Petocz, Lujza: *See—*
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Erdman, David M., to General Electric Company. Method and means for measuring the phase angle between current and voltage. 3,866,117, Cl. 324-54.000.

Ermolov, Ivan Vasilievich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Ernsberger, Fred M.; and Hollabaugh, Charles M., to PPG Industries, Inc. Subsurface cracks. 3,865,293, Cl. 225-2.000.

Ernsberger, Fred M.; and Hollabaugh, Charles M. Subsurface cracks. 3,865,294, Cl. 225-2.000.

Escher Wyss G.m.b.H.: *See—*
Holik, Herbert; and Mueller, Karl, 3,865,719.

Esquire, Inc.: *See—*
Isaacs, Richard R., 3,865,237.

Essen, Uilke Van: *See—*
Condolios, Elie; and Essen, Uilke Van, 3,865,725.

Essilor International (Compagnie Generale d'Optique): *See—*
Legendre, Serge, 3,865,178.

Estey Corporation: *See—*
Mastronardi, Pasquale Patrick John, 3,865,446.

Etablissements J. B. Gabriels S.P.R.L.: *See—*
Morjan, Jean, 3,864,813.

Etat Francaise Delegation Ministerielle pour l'Armement: *See—*
Delgendre, Jacques Claude; Kerreneur, Alain Roger; and Berton, Georges Albert, 3,865,037.

Ethyl Corporation: *See—*
Shin, Kju Hi; and Zaweski, Edward F., 3,865,906.
Stephens, Ruth E., 3,865,923.

Etra, Richard Henry; and Ransom, Victor Llewellyn, to Bell Telephone Laboratories, Incorporated. Method and apparatus for gathering peak load traffic data. 3,866,185, Cl. 340-172.500.

Evans, Clifford J. Digging tooth locking device. 3,864,854, Cl. 37-142.00A.

Evans Products Company: *See—*
Fuller, Oliver C., 3,865,046.

Everest & Jennings, Inc.: *See—*
Sully, Fenton F., 3,865,434.

Evers, Hendrikus Willemina, to U.S. Philips Corporation. Electric discharge tube, comprising a highly loaded anode. 3,866,076, Cl. 313-293.000.

Ewing, Lionel Lee. Closed loop communication wire system. 3,865,984, Cl. 179-2.00A.

Exxon Production Research Company: *See—*
Warren, Roy K., 3,866,111.

Exxon Research and Engineering Company: *See—*
Bagnoli, Donald L.; and Ciuffreda, Anthony R., 3,865,634.
Quelly, Joseph R.; and McNamara, Thomas P., 3,865,880.
Rase, Howard F.; and Maddox, Larry A., 3,865,750.
Robson, Harry E., 3,865,895.
Sosnowski, John, 3,865,716.
Tornqvist, Erik G. M.; and Cozewith, Charles, 3,865,749.

F. Joh. Kwizda: *See—*
Kwizda, Richard; and Kotlan, Johannes, 3,865,940.

F. L. Jacobs Company: *See—*
Nawrocki, Norbert Joseph, 3,866,004.

Fairchild Camera and Instrument Corporation: *See—*
Amelio, Gilbert F., 3,866,067.
Long, David K., 3,866,063.

Falender, James R.; Lindsey, Sarah E.; and Saam, John C., to Dow Corning Corporation. Method of blending polyolefins and polydiorganosiloxane gums and blends thereof. 3,865,897, Cl. 260-827.000.

Falkehag, Sten I., to Westvaco Corporation. Modified lignin surfactants. 3,865,803, Cl. 260-124.00A.

Fancher, LLewellyn W., to Stauffer Chemical Company. Dithiophosphate and dithiophosphonates. 3,865,905, Cl. 260-949.000.

Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning: *See—*
Mengler, Helmut, 3,865,816.
Schorr, Manfred; and Schrinner, Elmar, 3,865,820.
Spietschka, Ernst; and Urban, Manfred, 3,865,605.
Wagner, Dieter, 3,865,829.

Farlow Associates Inc.: *See—*
Eash, Robert E.; and Burkart, Robert C., 3,864,822.

Fastner, Thorwald: *See—*
Listhuber, Friedrich; Fastner, Thorwald; Bachner, Ernst; and Hoyer, Otto, 3,865,175.

Faust, Michael C.: and Seabold, Thomas W., to Minnesota Mining and Manufacturing Company. Hand-held multiple-die embossing tool. 3,865,224, Cl. 197-6.700.

Faustel Inc.: *See—*
Borski, William J., 3,865,017.

Fedelem, Joseph J.: *See—*
Klein, James H.; Romano, Anthony J.; Kukacka, Lawrence E.; and Fedelem, Joseph J., 3,865,075.

Fedorov, Viktor Viktorovich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Fedosenko, Igor Grigorievich: *See—*
Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna, 3,864,996.

Feindt, Hans-Heinrich, to U.S. Philips Corporation. Circuit arrangement for synchronising of the line deflection in a television receiver with a sawtooth signal having constant mean value and slope. 3,866,062, Cl. 307-228.000.

Feldman, Stanley; and Mellenthin, William J., to Belton Electronics Corporation. Digital audiometry apparatus and method. 3,865,982, Cl. 179-1.00N.

Fendglis, Richard A.: *See—*
Blackwell, John; and Fendglis, Richard A., 3,865,804.

Feniak, George, to Polysar Limited. Scorch retarders for halaogenated butyl. 3,865,763, Cl. 260-5.000.

Ferholz, Hans; Schmidt, Hans-Joachim; and Wunder, Friedrich, to Hoechst Aktiengesellschaft. Process for the manufacture of sorbic acid. 3,865,872, Cl. 260-526.00N.

Ferragut Rodriguez, Miguel. Machine driven by rotary pistons. 3,865,093, Cl. 123-44.00D.

Ferrari, Ottavio. Method for the production of sheath containers. 3,865,667, Cl. 156-285.000.

Ferruti, Paolo: *See—*
Marchisio, Maria Antonietta; Ferruti, Paolo; Longo, Tito; and Danusso, Ferdinando, 3,865,723.

Fibrac, Inc.: *See—*
Carter, Harry T., 3,864,782.

Fichtel & Sachs AG: *See—*
Wossner, Felix, 3,865,356.

Fiegel, Harry J., Jr.; and Thatcher, Russell S., to Kels Marine, Inc. Method for assembly of cylindrical weided tanks in situ in horizontal position. 3,864,812, Cl. 29-471.100.

Field, George Francis; and Schneider, Joachim Ulrich, to Hoffmann-La Rcche Inc. 2-(Benzoyl)-3-dimethylaminoacrylonitriles. 3,865,863, Cl. 260-465.00E.

Fielding, Lawrence E.; and O'Brien, Patrick J., to United States of America, Air Force. Quick release open link. 3,865,333, Cl. 244-151.00B.

Figueroa, David R., to Coulter Electronics, Inc. Integerator system of wide range and pump circuit therefor. 3,866,131, Cl. 328-152.000.

Filippov, Vladimir Vasilievich: *See—*
Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna, 3,864,996.

Finch, Eve B.; and Finch, Sheila A. Elevated safety bathtub. 3,864,762, Cl. 4-173.000.

Finch, Sheila A.: *See—*
Finch, Eve B.; and Finch, Sheila A., 3,864,762.

Finney, William J.: *See—*
Gogolick, Roland M.; Brown, Richard L.; and Finney, William J., 3,864,772.

Fire-Alert Company: *See—*
Ried, Louis, Jr., 3,866,195.

Firestone Tire & Rubber Company, The: *See—*
Higbee, Wallace C.; Wilcox, Howard A.; and Jensen, Jay W., 3,865,329.
Lohr, Delmar F., Jr.; and Kay, Edward L., 3,865,781.

Firth, Jack Graham: *See—*
Bott, Barry; Firth, Jack Graham; Jones, Alan; and Jones, Thomas Alwyn, 3,865,550.

Fischer, Adolf: *See—*
Rohr, Wolfgang; and Fischer, Adolf, 3,865,860.

Fischer, Edgar, to Hoechst Aktiengesellschaft. Mixer for highly viscous fluids. 3,865,353, Cl. 259-118.000.

Fischer & Porter Co.: *See—*
Burgess, Thomas H.; and Herzl, Peter J., 3,864,972.

FisHair Incorporated: *See—*
Duescher, Margie F., 3,864,864.

Fisher, Gordon Lloyd; and Cupp, Calvin Robert, to International Nickel Company, Inc., The. Mechanical alloying and interdispersion cold bonding agents therefor. 3,865,572, Cl. 75-0.50R.

Fisher, Josephine Francis. Fringe measure. 3,864,795, Cl. 28-2.000.

Fitzpatrick, Joseph F., Jr.: *See—*
Cebula, Leonard A.; Fitzpatrick, Joseph F., Jr.; and Kershaw, Justin A., Jr., 3,866,126.

Flachglas Aktiengesellschaft Delog-Detag: *See—*
Weigt, Paul, 3,866,232.

Flaherty, John J.: *See—*
Strauts, Eric J.; Flaherty, John J.; and Lorenzi, Donald E., 3,866,116.

Flatland, Lloyd P. Speed governor for a dental handpiece. 3,865,505, Cl. 415-149.000.

Fletcher, Kenneth S., III: *See—*
Light, Truman S.; and Fletcher, Kenneth S., III, 3,865,708.

Fley-O-Lators, Inc.: *See—*
Arnold, Harmon W., 3,865,675.

Flichy, Jacques E., to Ateliers Metallurgiques de Saint-Urban. Means for securing a circular part in the form of a disc in the interior of a cylindrical part. 3,865,499, Cl. 403-326.000.

Flier, Ronald J.: *See—*
Coppage, Thomas B.; Flier, Ronald J.; and Payne, Bernard M., 3,865,966.

Flores, Jose A.: *See—*
Gates, Louis E., Jr.; Lent, William E.; and Flores, Jose A., 3,866,234.

Florian, Eugene F., to Mark Products, Inc. Geophone takeout assembly for seismic cables. 3,866,162, Cl. 340-17.000.

Flynn, James P.; Lane, George A.; and Plomer, John J., to Adamas Carbide Corporation. Plasticized nitrocellulose propellant composition containing aluminum hydride and nitronium perchlorate. 3,865,656, Cl. 149-7.000.

Flynn, James P., to Dow Chemical Company, The. Solid composite propellant containing fluoroamino polymers. 3,865,657, Cl. 149-19.300.

Flynn, James P., to Dow Chemical Company, The. Propellant composition containing nitrocellulose and a copolymer of perfluoroguanidine and formaldehyde. 3,865,658, Cl. 149-19.300.

Flynn, James P.; Lane, George A.; and Plomer, John J., to Dow Chemical Company, The. Nitrocellulose propellant composition containing metal and triaminoguanidinium hydrazinium diazide. 3,865,659, Cl. 149-19.400.

FMC Corporation: *See—*
Begun, Robert A.; Thuse, Erik; and McGee, Arthur L., 3,865,142.
Broling, Fred W.; Baker, Jeffrey A.; and Matras, Edward J., 3,865,727.
Ouska, Ralph Charles, 3,865,231.
Sheetz, Charles E.; and McClintic, Wayne L., 3,864,894.
Sterner, Robert A., 3,865,364.

Fohl, Arthur, to Remswerk Christian Foll & Sohne. Thread cutting device. 3,864,774, Cl. 10-120.500.

Foik, Adolf, to Gewerkshaft Eisenhutte Westfalia. Apparatus for use in driving tunnels. 3,864,925, Cl. 61-84.000.

Foley, Gerard X. Book strap. 3,865,292, Cl. 224-55.000.

Folman, Ralph, to Raymond Lee Organization, Inc., The, a part interest. Blood circulating device. 3,865,103, Cl. 128-64.000.

Fontana, Serge Robert: *See—*
Charransol, Pierre; Hauri, Jacques; and Fontana, Serge Robert, 3,865,991.

Foote Mineral Company: *See—*
Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., 3,865,583.
Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., 3,865,584.

Ford, Eric Harold, to Lumenition Limited. Devices for measuring shaft R.P.M. 3,866,120, Cl. 324-175.000.

Ford, Thomas E.: *See—*
Pothier, Robert G.; and Ford, Thomas E., 3,865,301.

Foreman, Robert W., to Park Chemical Co. Water based quenching composition and method. 3,865,642, Cl. 148-28.000.

Forg, John H.; and Payet, George L., to McGraw-Edison Company. Durable press method. 3,865,545, Cl. 8-116.00R.

Formac International Inc.: *See—*
Langford, Frederic E., 3,865,251.

Forney Engineering Company: *See—*
Paredes, Candelario; and Horn, Robert, 3,866,200.

Forsberg, Rolf Hermann: *See—*
Pilhall, Stig Tore Lennart; Schalin, Pehr Harald Benedictus; Bohlin, Nils Ivar; and Forsberg, Rolf Hermann, 3,865,397.

Fortnam, George A.; and Sams, Ivan E., to Den-Tal-Ez Mfg., Co. Dental stool for dentist and dental assistant. 3,865,341, Cl. 248-404.000.

Fosroc AG: *See—*
Pearson, Leonard Louis; and Plaisted, Anthony Cecil, 3,865,600.

Foster Wheeler Corporation: *See—*
De Poister, David C., 3,865,084.

Foundation Cryogenic Joint Venture: *See—*
McKay, Alexander R.; and Masterson, Daniel M., 3,865,145.

Fouquet-Werk Frauz & Planck, Firma: *See—*
Kuhn, Falk, 3,864,941.

Fox, William Charles, to Veeder Industries, Inc. Timer switch assembly controlling continuous and intermittent operations of an oven. 3,866,003, Cl. 200-38.0FA.

Foxboro Company, The: *See—*
Light, Truman S.; and Fletcher, Kenneth S., III, 3,865,708.

Fraige, Richard; and Read, Jerry, to Said Fraige by said Read. Water mattress with internal float tube. 3,864,768, Cl. 5-348.0WB.

Frank, Karl: *See—*
Frank, Martin; and Frank, Karl, 3,864,936.

Frank, Martin; and Frank, Karl, to Burger Eisenwerke AG. Container for shipping perishables. 3,864,936, Cl. 62-385.000.

Franks, Charles R.: *See—*
Schenker, Barry A.; Kolb, James M.; and Franks, Charles R., 3,865,703.

Frazier, Thomas J. Apparatus for subsoil irrigation. 3,865,057, Cl. 111-7.000.

Frazzell, Michael E.; and Snyder, Richard H., to Brunswick Corporation. Propeller construction. 3,865,509, Cl. 416-93.000.

Freck, David Vernon, to Central Electricity Generating Board. Coated particle fuel for nuclear reactors and to the manufacture of such fuel. 3,866,043, Cl. 250-303.000.

Freeman, John Thomas; Heiart, Robert Bernard; and Leberzammer, Ernst, to du Pont de Nemours, E. I., and Company. Photohardenable layer with integral support of fabric or mesh. 3,865,589, Cl. 96-35.100.

Freeman, Richard B., Sr. Casing and drill pipe handling device. 3,865,256, Cl. 214-2.500.

French, Marie M. Pet trailer. 3,865,425, Cl. 296-24.00C.

Frenken, Hans: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Frenken, Hans; Friedsam, Josef; and Meinhardt, Gunter, 3,864,843.

Freytag, Wolfram Gustav: *See—*
Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, 3,865,952.

Fried, John H.: *See—*
Edwards, John A.; and Fried, John H., 3,865,883.
Fried. Krupp, Gesellschaft mit beschrankter Haftung: *See—*
Wehling, Rolf; and Neubert, Rolf, 3,864,902.
Friedman, Fred; and Friedman, Gertrude. Nail polish dryer. 3,864,847, Cl. 34-202.000.
Friedman, Gertrude: *See—*
Friedman, Fred; and Friedman, Gertrude, 3,864,847.
Friedman, Herman H.; Lysak, David A.; and Hornyak, John, to General Foods Corporation. Comminuted meat product stabilized with jicama. 3,865,955, Cl. 426-142.000.
Friedman, Robert H., to Getty Oil Company. Methods for selective plugging. 3,865,189, Cl. 166-294.000.
Friedrich Boysen, Firma: *See—*
Kern, Herbert, 3,864,909.
Friedsam, Josef: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Frenken, Hans; Friedsam, Josef; and Meinhardt, Gunter, 3,864,843.
Fries, Bernard A., to Chevron Research Company. Radioactive grease containing krypton 85. 3,865,736, Cl. 252-11.000.
Frohlich, Alfons, to Opti-Holding AG. Slide fastener and method of making same. 3,864,945, Cl. 66-193.000.
Fromson, Howard A. Process and apparatus for continuously anodizing aluminum. 3,865,700, Cl. 204-28.000.
Frutschi, Hansulrich. Relief arrangement for closed gas turbine installation. 3,864,919, Cl. 60-657.000.
Frye, George L., Jr.; and Gibson, Herman B., Jr., to Educational Computer Corporation. Random access projector and multi-frame cartridge therefore. 3,865,479, Cl. 353-110.000.
Fryer, Rodney Ian; and Walser, Armin, to Hoffmann-La Roche Inc. 7-Hydroxyamino-1,4-benzodiazepines. 3,865,815, Cl. 260-239.30D.
Fuji Photo Film Co., Ltd.: *See—*
Kobayashi, Teruo; Inoue, Kazuo; and Sawaguchi, Hiroshi, 3,865,817.
Ohkubo, Kinji; and Kato, Kazunobu, 3,865,592.
Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, 3,865,478.
Oshima, Shigeru, 3,865,327.
Shiba, Keisuke; Hinata, Masanao; Amano, Hiroyuki; and Hara, Hiroshi, 3,865,598.
Taguchi, Seiichi; Tezuka, Sigeru; Tomotsu, Takeshi; and Mizuki, Eiichi, 3,865,033.
Yoshida, Yoshinobu, 3,865,593.
Fujii, Chiyuki: *See—*
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Fujino, Toji: *See—*
Ohto, Michihiro; Noshiro, Atsumi; Mayuzumi, Tetsuya; and Fujino, Toji, 3,865,588.
Fujita, Kinji, to Kabushiki Kaisha Suwa Seikosha. Method and apparatus for measuring the timing of quartz crystal timepieces. 3,864,957, Cl. 73-6.000.
Fujitsu Limited: *See—*
Yamada, Hiroshi; and Yoshioka, Yoshiro, 3,866,182.
Fukai, Masakazu: *See—*
Asai, Komei; Fukai, Masakazu; and Moriyama, Akio, 3,865,469.
Fukuda, Kazuo: *See—*
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Fukui, Tutomu: *See—*
Shimizu, Takehiro; and Fukui, Tutomu, 3,865,002.
Fukushima, Danji; Hattori, Terumitsu; and Arai, Akira, to Kikkoman Shoyu Co., Ltd. Process for producing soybean food paste and the resulting product. 3,865,956, Cl. 426-195.000.
Fukushima, Osamu: *See—*
Sato, Masamichi; and Fukushima, Osamu, 3,865,611.
Fuller, Oliver C., to Evans Products Company. Hopper discharge gate sealing structure. 3,865,046, Cl. 105-253.000.
Furukawa Electric Co., Ltd., The: *See—*
Horie, Toshio; Yoshida, Kazuaki; Hori, Hisako; and Katsuyama, Yoshihisa, 3,865,871.
Furuya, Tetsuo; Ibe, Yoshio; and Kanisawa, Hideo, to Koniskinoku Photo Industry Co., Ltd. Direct-positive reduction and gold togged ammonic silver halide emulsion. 3,865,596, Cl. 96-108.000.
G. D. Searle & Co.: *See—*
Chorvat, Robert J.; and Pappo, Raphael, 3,865,833.
Nysted, Leonard N., 3,865,848.
G. Rau: *See—*
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G & W Maschinen AG: *See—*
Risi, Walter; and Knecht, Rudolf, 3,864,796.
Gaffney, William, to Mintz, Charlotte. Apparatus for making plastic bags with handles. 3,865,018, Cl. 93-8.0WA.
Gagnon, Pierre; and Laforest, Pierre. Automatic bundle strapping machine. 3,865,025, Cl. 100-26.000.
Galanaugh, Charles F.: *See—*
Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.
Galasso, Francis S.; and Bourdeau, Romeo G., to United Aircraft Corporation. Preparation of alumina monofilaments. 3,865,917, Cl. 264-183.000.
Galen, Ralph W.; and Vanderpoel, John A. Bicycle rack. 3,865,244, Cl. 211-5.000.
Gallagher, Robert T.: *See—*
Bogart, George E.; Gallagher, Robert T.; and Lolli, Lawrence V., 3,865,676.
Gallati, Fritz, to Mettler Instrumente AG. Laboratory feeding device for particulate material. 3,865,278, Cl. 222-161.000.
Games, Abram, to Imagic Limited. Development of image copies provided by differential absorption of liquids. 3,865,607, Cl. 117-1.700.
Gammerler, Hagen; and Bohm, Harald. Rocking mill. 3,865,318, Cl. 241-170.000.
Garkisch, Otto Ludwig; Ibing, Gunther; Kammholz, Gunther; Schirrmacher, Hermann; and Lohbeck, Kurt, to Verba-Chemie AG; and Metallgesellschaft AG, part interest to each. Process for obtaining high-purity maleic anhydride from crude maleic anhydride. 3,865,849, Cl. 260-346.80M.
Garner, Paul Johnson, to Imperial Chemical Industries Limited. Injection moulding of complex shaped laminar articles. 3,865,915, Cl. 264-55.000.
Gast, Fred C. Navigation device. 3,865,477, Cl. 353-11.000.
Gates, Louis E., Jr.; Lent, William E.; and Flores, Jose A., to United States of America, Navy. Shaped ceramic dielectric antenna lens. 3,866,234, Cl. 343-911.00R.
Gates, Wendall C.: *See—*
Schontzler, James G.; Gates, Wendall C.; and DaGragnano, Victor L., 3,866,028.
Gauss, Walter; Petersen, Siegfried; Ranz, Erwin; Himmelmann, Wolfgang; and von Rintelen, Harald, to Agfa-Gevaert Aktiengesellschaft. Light sensitive photographic material. 3,865,594, Cl. 96-84.00R.
Gayet, Claire: *See—*
Abegg, Jean-Louis; and Gayet, Claire, 3,865,930.
Gaylord, Norman G., to Dart Industries Inc. Organopolysiloxane elastomers exhibiting high elongation. 3,865,788, Cl. 260-46.50G.
Gayman, Byron G.; and Henzel, Russell A., to Honeywell Information Systems, Inc. Interrupt sequencing control apparatus. 3,866,181, Cl. 340-172.500.
Gearhart-Owen Industries, Inc.: *See—*
Doggett, Glenn O.; and Hallmark, Bobby Joe, 3,865,188.
Kuhns, John P., 3,865,264.
Gearhart, Walter S., to United States of America, Navy. Wobble plate pump. 3,865,503, Cl. 415-70.000.
Geary, Neil Driscoll. Inflatable water-resistant life-saving apparatus. 3,864,773, Cl. 9-316.000.
Gebert, Karl, to Dunlop Limited. Pneumatic tires. 3,865,167, Cl. 152-212.000.
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., to General Cable Corporation. Hydraulic System with Bi-Rotational Pump. 3,864,911, Cl. 60-430.000.
Geller, Richard; Juillet, Francois; and Meriaudeau, Paul, to Commissariat a l'Energie Atomique. Device for producing a homogeneous beam of solid particles. 3,866,039, Cl. 250-251.000.
General Cable Corporation: *See—*
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., 3,864,911.
General Electric Company: *See—*
Bochan, John, 3,864,986.
Christie, George, 3,865,778.
Datta, Ranajit K.; and Luscher, Thomas, 3,866,083.
Doser, Manfred, 3,864,808.
Erdman, David M., 3,866,117.
Gjaja, Niko V., 3,866,073.
Heidtmann, Donald S., 3,864,844.
Hurko, Bohdan, 3,866,018.
Merrill, Duane F., 3,865,766.
Ohmstedt, Harry O.; Ruth, William H.; and Gibbs, Edward E., 3,864,803.
Pauze, Denis R., 3,865,785.
Powell, Walter F., 3,866,087.
Smith, Robert A., 3,865,759.
Weiser, Earnest Franklin, 3,866,098.
General Foods Corporation: *See—*
Friedman, Herman H.; Lysak, David A.; and Hornyak, John, 3,865,955.
General Motors Corporation: *See—*
Ballantyne, David B.; Mantel, Edward R.; and Robinson, George H., 3,865,638.
Bourbeau, Frank J., 3,866,099.
Briar, John R., 3,865,222.
Bright, James A., 3,864,933.
Epner, Elliot J.; Kitchin, Oscar G.; and Sampatacos, Peter M., 3,865,394.
Kellams, Roger W.; and Dyer, Clarence H., 3,865,079.
Kerscher, William J., III; and Crawford, Daniel A., 3,866,166.
Lovdahl, Richard H., 3,864,992.
Mayfield, Albert H., 3,865,159.
Sihon, Tanas M., 3,865,087.
Zeigler, Philip B., 3,865,273.
General Signal Corporation: *See—*
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DePaola, John J.; and Morse, Charles W., 3,865,042.
General Steel Industries, Inc.: *See—*
Jones, William Clifford, Jr., 3,865,045.
Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., to Becton, Dickinson and Company. Liquid dispensing apparatus. 3,865,274, Cl. 222-37.000.
George, Edwin Francis, to Riddell, William Duncan; and Imperial Chemical Industries Limited. Plant growth stunting process. 3,865,570, Cl. 71-76.000.
Gerber Garment Technology, Inc.: *See—*
Pearl, David R.; and Robison, Samuel Clifford, 3,864,997.

Gergel, William C., to Lubrizol Corporation, The. Thiourea-acylated polyamine reaction product. 3,865,813, Cl. 260-239.30R.

Gergen, William P., to Shell Oil Company. Kink-resistant polymeric tubing. 3,865,776, Cl. 260-33.6AQ.

Gerhard Berger Fabrik Elektrischer Messgerate: *See*—
Heine, Gunter, 3,866,104.

Gerlach, C. Richard, to Micro-Gen Equipment Corporation. Centrifugal compressor. 3,865,506, Cl. 415-213.00R.

Gerschon, Wilfried R.: *See*—
Langdon, Roy A.; and Gerschon, Wilfried R., 3,865,535.

Gesellschaft Zur Forderung Der Forschung un Der EIDG. Techn.: *See*—
Engler, Christoph, 3,866,040.

Getgen, Lawrence E., to GTE Automatic Electric Laboratories Incorporated. Pulse train wave shaping means and method. 3,865,988, Cl. 179-15.0AA.

Getty Oil Company: *See*—
Friedman, Robert H., 3,865,189.

Gewerkshaft Eisenhutte Westfalia: *See*—
Foik, Adolf, 3,864,925.

Ghosh, Asoke Kumar; and Moody, Harry John, to RCA Corporation. Microwave spectrometer. 3,866,118, Cl. 324-58.50A.

Gibbs, Edward E.: *See*—
Ohmstedt, Harry O.; Ruth, William H.; and Gibbs, Edward E., 3,864,803.

Gibson, Herman B., Jr.: *See*—
Frye, George L., Jr.; and Gibson, Herman B., Jr., 3,865,479.

Gidaspow, Dimitri; and Onischak, Michael, to Institute of Gas Technology. Process for regenerative sorption of $CO_2$. 3,865,924, Cl. 423-230.000.

Gidding & Lewis Inc.: *See*—
McGee, John K.; and Kolell, Norbert C., 3,866,179.

Giddings & Lewis, Inc.: *See*—
Simon, James B.; and Bullock, Thomas B., 3,866,212.

Gieschen, Kurt; and Hecker, Wolfgang, to U.S. Philips Corporation. Drive system for the image section of an x-ray apparatus. 3,866,048, Cl. 250-449.000.

Gilbaugh, John W. Plant transplanter. 3,865,055, Cl. 111-4.000.

Giles, Dion Ewing: *See*—
Parker, Alan James; Waghorne, Winfield Earle; Giles, Dion Ewing; Sharp, John Howard; Alexander, Robert; and Muir, David Michael, 3,865,744.

Gillette Company, The: *See*—
Bailey, David C., Jr., 3,864,896.
Hitchcock, William F., 3,864,897.

Gillette, Donald J.: *See*—
Goodridge, William C.; Gillette, Donald J.; English, William P.; and Minckler, G. Mark, 3,865,610.

Gillis, Richard D. Telephone lock kit. 3,866,000, Cl. 179-189.00D.

Ginsberg, Guenter, to Coulter Electronic, Inc. Liquid level indicating system. 3,865,069, Cl. 116-4.000.

Girard, Lucien, III: *See*—
Sareen, Sarvajit S.; Girard, Lucien, III; and Hard, Robert A., 3,865,435.

Gjaja, Niko V., to General Electric Company. Composite conformable support structure element. 3,866,073, Cl. 310-260.000.

Glass, Daniel S. Universal faced body fluid drainage bag with universal drainage means. 3,865,165, Cl. 150-1.000.

Glass, Marvin I.; and Breslow, Jeffrey D., to Marvin Glass & Associates. Game apparatus. 3,865,376, Cl. 273-125.00A.

Glass, Marvin I.: *See*—
Breslow, Jeffrey D.; and Glass, Marvin I., 3,865,367.

Gleason, C. Roy; and Thomas, Gordon A., to World-Wide Paper Reclamation, Inc. Composition for reclaiming pulp from waste papers. 3,865,684, Cl. 162-8.000.

Gleason Works, The: *See*—
Deprez, Thomas A.; and Whalley, Frank M., 3,865,533.

Globe-Union Inc.: *See*—
Cox, Roger Douglas; and Michaels, Walter Bernard, 3,865,154.

Glockler, Otto: *See*—
Eichler, Dieter; Glockler, Otto; and Bertsch, Richard, 3,865,089.

Godbersen, Byron L. Safety locked boat raising device. 3,865,223, Cl. 193-42.000.

Goffe, William L., to Xerox Corporation. Imaging process using vertical particle migration. 3,866,236, Cl. 346-74.0ES.

Gogolick, Roland M.; Brown, Richard L.; and Finney, William J., to United States of America, Navy. Depth control. 3,864,772, Cl. 9-8.00R.

Gold, Max. Dispenser and liquid applicator for toilet paper, paper towels, and the like. 3,865,271, Cl. 221-96.000.

Goldenberg, David Milton, to Hoffmann-La Roche Inc. Method of producing carcinoembryonic antigens. 3,865,689, Cl. 195-1.700.

Goldschmidt, Alfred, to Chevron Research Company. Multifunctional lubricating oil additive. 3,865,740, Cl. 252-46.700.

Goldwasser, Eugene: *See*—
Chiba, Shyozo; Kung, Charles K. H.; and Goldwasser, Eugene, 3,865,801.

Goller, Heinz: *See*—
Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, 3,865,858.

Gomersal, Keith; and Padgett, Brian, to Rotax Limited. Governor. 3,865,125, Cl. 137-51.000.

Goodridge, William C.; Gillette, Donald J.; English, William P.; and Minckler, G. Mark, to Electrostatic Equipment Corporation. Coating method with precure and apparatus therefor. 3,865,610, Cl. 117-17.000.

Goos, Heinz: *See*—
Rosenkranz, Otto; Rose, Peter; and Goos, Heinz, 3,865,912.

Goralski, Christian T.; and Klingler, Thomas C., to Dow Chemical Company, The. 1,1-Dihalo-1-(methylsulfonyl)methanesulfonamides. 3,865,822, Cl. 260-247.10R.

Gordon, Ronnie D., to Continental Oil Company. Process for removing lower alkyl chlorides from vinyl chloride monomers. 3,865,887, Cl. 260-656.00R.

Gordon, Wolfgang; Rust, Kurt; and Schrott, Erwin, to Hoechst Aktiengesellschaft. Process for the polymerisation of mono-olefins. 3,865,902, Cl. 260-878.00B.

Gorham International Inc.: *See*—
Sawyer, Willard C., 3,864,842.

Gorka, Andrew J., Jr., to United States of America, Atomic Energy Commission. Moving foil stripper for a particle accelerator. 3,866,132, Cl. 328-233.000.

Goser, Karl. Logic circuit having a switching transistor and a load transistor, in particular for a semiconductor storage element. 3,865,653, Cl. 148-187.000.

Goto, Eiichi; Ohiwa, Hajime; Iwata, Kansei; and Urano, Tadao, to Rikagaku Kenkyusho; and Iwatsu Electric Co., Ltd. Apparatus for displaying image informations. 3,866,207, Cl. 340-324.0AD.

Gottschalk, Alfred: *See*—
Metzinger, Lothar; Gottschalk, Alfred; Schoettle, Klaus; and Schwaab, Josef, 3,865,672.

Gottschol, Hans Joachim; and Gottschol, Karl Josef, to Metallurgische Forschungsanstalt. Body for deoxidizing molten steel by submersion therein. 3,865,577, Cl. 75-58.000.

Gottschol, Karl Josef: *See*—
Gottschol, Hans Joachim; and Gottschol, Karl Josef, 3,865,577.

Gould, Henry: *See*—
Bruson, Herman A.; and Gould, Henry, 3,865,793.

Graham, Dennis P.: *See*—
Schwab, Delmar G.; and Graham, Dennis P., 3,865,207.

Granges Engineering AB: *See*—
Ahacic, Kozma; and Ljungstromer, Lars-Einar, 3,865,177.

Granges Essen Aktiebolag: *See*—
Sieurin, Sven Ivan, 3,865,282.

Gray, Robert Borland, to J. & P. Coats Limited. Apparatus for producing dyes and cleaned material. 3,864,947, Cl. 68-18.00R.

Grazebrook, Robert Francis Needs. Gaming machines games of skill. 3,865,368, Cl. 273-1.00E.

Green, Richard A.: *See*—
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., 3,864,911.

Greenberg, Charles B., to PPG Industries, Inc. Q-switching device for glass lasers. 3,865,747, Cl. 252-301.10L.

Greenhalgh, Lloyd V. Portable decorative plastic sprinkling fence. 3,865,309, Cl. 239-268.000.

Greenstein, Bernard, to Owens-Illinois, Inc. Resistor Compositions. 3,865,742, Cl. 252-63.500.

Greenwood, Roger, to International Telephone and Telegraph Corporation. Solenoid-operated, three-way fuel valve with pressure balancing. 3,865,140, Cl. 137-625.640.

Gref, Hans: *See*—
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Frenken, Hans; Friedsam, Josef; and Meinhardt, Gunter, 3,864,843.

Gregory, Charles Roy; and White, William Harold, to Harris-Intertype Corporation. Cmos analog switch. 3,866,064, Cl. 307-251.000.

Gregory, M. Duane: *See*—
Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., 3,865,735.

Greig, Margaret E., to Upjohn Company, The. Process of treatment. 3,865,949, Cl. 424-317.000.

Grenier, Raymond P., to Baird-Atomic, Inc. Zone grid assembly particularly for high resolution radioactivity distribution detection systems. 3,865,976, Cl. 178-18.000.

Gretag Aktiengesellschaft: *See*—
Binder, Erich, 3,865,324.

Greve, Heinz, to Hauni-Werke Korber & Co. KG. Method of producing filter rod sections or the like. 3,865,016, Cl. 93-1.00C.

Griebsch, Eugen: *See*—
Brinkmann, Bernd; and Griebsch, Eugen, 3,865,791.

Grissom, John T.; and Shope, Leslie A., to United States of America, Atomic Energy Commission. Vacuum type trigger discharge tube with cup shaped anode. 3,866,075, Cl. 313-178.000.

Grochowski, Edward G.: *See*—
Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L., 3,865,648.

Grossman, Jack J., to McDonnell Douglas Corporation. Filter spectrograph. 3,865,490, Cl. 356-76.000.

Grover, George M., to Q-Dot Corporation. Heat pipe and method and apparatus for fabricating same. 3,865,184, Cl. 165-105.000.

Grund, J. Evan, to Nuclear Equipment Corporation. Apparatus for determining concentration profile of an element. 3,866,044, Cl. 250-310.000.

Gruppo Lepetit S.p.A.: *See*—
Cricchio, Renato; and Lancini, Giancarlo, 3,865,812.

Gryaznov, Vladimir Mikhailovich: *See*—
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 3,865,891.

Gryglas, Bogdan R., to Efdyn Corporation. Continuous rotary damper. 3,865,216, Cl. 188-290.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Buhrke, Rolfe E.; Chang, Gregory I.; and Horiuchi, Edward M., 3,866,184.
Burns, Robert V., 3,866,092.
Getgen, Lawrence E., 3,865,988.

GTE Sylvania Incorporated: *See—*
Brenan, Robert R.; Bunker, Thomas D.; and Thompson, David F., 3,864,820.
Painter, Howard S.; and Armstrong, Donald E., 3,865,537.
Stacy, John C.; Vetere, John J.; and Bennett, Sedgwick R., 3,866,033.

Gubin, Sergei Pavlovich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Guest, William H. Multiple tool attachment. 3,864,793, Cl. 24-243.0CC.

Gugler, Victor F. Method for folding dough. 3,865,963, Cl. 426-297.000.

Gulf & Western Manufacturing Company Systems: *See—*
Reiss, Martin H.; and Adams, James R., 3,866,202.

Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich. Device for producing semi-product tubes of constant inner diameter with thinned ends. 3,864,951, Cl. 72-6.000.

Gunji, Katuhiko: *See—*
Kobayashi, Masaki; Kawakami, Izumi; and Gunji, Katuhiko, 3,866,155.

Gunter, Feier: *See—*
Wolfgang, Brenner; Gunter, Feier; and Antonius, Vinnemann, 3,865,148.

Guntert, Ronald M. Dredge chain, sprocket, and combination. 3,864,851, Cl. 37-69.000.

Guttinger, Manfred, to Sandco Ltd. Process and apparatus for food freezing. 3,864,931, Cl. 62-63.000.

Guzzo, Francesco, to Beatrice Foods Co. Molding apparatus. 3,865,529, Cl. 425-249.000.

H. Goodman & Sons, Inc.: *See—*
Herzog, Milton W., 3,865,249.

Haarer, Erich: *See—*
Schulz, Gerhard; Matthias, Guenther; Kasper, Werner; and Haarer, Erich, 3,865,846.

Haasl, William D., to Brunswick Corporation. Stern drive engine mount. 3,865,068, Cl. 115-34.00R.

Haberl, Ludwig: *See—*
Schieweck, Hubert; Steinle, Georg; and Haberl, Ludwig, 3,865,957.

Habert, William Charles, to Uniroyal Inc. Breaker-tread assembly transfer ring size changing mechanism. 3,865,670, Cl. 156-394.000.

Haddon, Jesse E. Lumber making attachment for a chain saw. 3,864,830, Cl. 30-371.000.

Haden, Elard L., to Continental Oil Company. Acoustic emission in drilling wells. 3,865,201, Cl. 175-50.000.

Haferkorn, Herbert: *See—*
Ibing, Gunther; and Haferkorn, Herbert, 3,865,696.

Hager Aktiebolag: *See—*
Hager, Bror Olof, 3,865,932.

Hager, Bror Olof, to Hager Aktiebolag. Compounds of copper, chromium and arsenic as wood preservatives. 3,865,932, Cl. 424-128.000.

Haglund, Claude R. Vehicle signalling apparatus. 3,866,169, Cl. 340-79.000.

Hagood, Jerry W.: *See—*
Norman, Ralph L.; Hagood, Jerry W.; and Shelton, Joe, 3,866,078.

Hainaut, Daniel; Toromanoff, Edmond; and Demoute, Jean-Pierre, to Roussel-Uclaf. Process of preparation of alkyl tridecatrienoates and intermediates. 3,865,854, Cl. 260-410.90R.

Haines, James R. Vernier bow sight. 3,864,836, Cl. 33-265.000.

Hakansson, Sven, to Kommanditbolaget United Stirling (Sweden) AB & Co. Sealing means for the piston rod of a stirling engine. 3,865,015, Cl. 92-78.000.

Haldemann, Gaston, to Haldemann S.A. Safety binding for releasably securing a boot to a ski. 3,865,388, Cl. 280-11.35D.

Haldemann S.A.: *See—*
Haldemann, Gaston, 3,865,388.

Hale, Jesse R. Sandwich panel having cellular core structure with reinforcing elements. 3,865,679, Cl. 161-68.000.

Hall, Charles M.; and Johnson, Herbert G., to Upjohn Company, The. 1,1′,4,4′-Tetrahydro-4,4′-dioxo(6,6′biquinoline)-2,2′-dicarboxylates. 3,865,831, Cl. 260-286.00R.

Hall, George: *See—*
Saxl, Karel; and Hall, George, 3,865,415.

Hall, Trenton O. Air scrubber apparatus with grease removal means. 3,865,193, Cl. 169-65.000.

Hallerback, Stig Lennart, to SKF Industrial Trading and Development Company N.V. Electric machines. 3,866,071, Cl. 310-43.000.

Halliburton Company: *See—*
Dial, Darrell D.; and von Bose, Robert J., 3,864,922.

Hallmark, Bobby Joe: *See—*
Doggett, Glenn O.; and Hallmark, Bobby Joe, 3,865,188.

Hallmark Cards, Incorporated: *See—*
Donovan, Robert W.; Kolster, Harvey L.; Broeker, Herbert H.; and Bailey, George W., 3,865,248.

Halter, Jerome Barth, to RCA Corporation. Triangular piezoelectric transducer for recording video information. 3,865,997, Cl. 179-100.41P.

Halvorsen, Harold W. Kitchen appliance for skimming fat. 3,865,023, Cl. 99-495.000.

Hamann, Fred H., to Raymond Lee Organization, Inc., The. Tool extension. 3,865,502, Cl. 408-226.000.

Hambak Maschinenfabrik KG: *See—*
Sybertz, Hans, 3,865,164.

Hamilton, Munroe H. Means for moving a ski boot buckle into and out of a closed position. 3,864,769, Cl. 7-17.000.

Hamlin, John R., to Container Corporation of America. Display carton with platform support. 3,865,233, Cl. 206-45.190.

Hamm, Philip C.: *See—*
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Hammack, Calvin Miles. Method and apparatus for automatically determining position-motion state of a moving object. 3,866,229, Cl. 343-112.00R.

Hanfly, Bernard C.: *See—*
Wenckus, Joseph F.; Castonguay, Roger A.; Hanfly, Bernard C.; and Mallahan, Francis J., 3,865,554.

Hanson, Le Roy P.; and Trost, Calvin E. Method of repairing stripped spark plug threads in engine heads. 3,864,806, Cl. 29-401.000.

Hapke, Kenyon A.: *See—*
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Hara, Hiroshi: *See—*
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Hard, Robert A.: *See—*
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Harder, Karl-Max: *See—*
Tauern, Dankmar; Wild, Rainer; and Harder, Karl-Max, 3,866,012.

Hardin, William Warner; Peterson, David Ernest; and Towne, Delbert Douglas, to International Business Machines Corporation. Apparatus and method for unloading mail stackers. 3,865,365, Cl. 271-214.000.

Hardy, Herbert L.; Murray, Joseph E., Jr.; and Wray, William R. Motion picture viewer with sound system. 3,865,475, Cl. 352-34.000.

Hargis, Billy M., to Minnesota Mining and Manufacturing Company. Process and composite leadless chip carriers with external connections. 3,864,810, Cl. 29-423.000.

Harrington, Joseph Kenneth; and Trepka, Robert D., to Minnesota Mining and Manufacturing Company. N-(thienylalkyl)-fluoroalkanesulfonadmies. 3,865,844, Cl. 260-332.500.

Harris, Guy H.: *See—*
Tveter, Elmer C., deceased; Harris, Guy H.; and Lindy, Lowell B., 3,865,718.

Harris, Harold E., Jr.: *See—*
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Harris-Intertype Corporation: *See—*
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Harrison, Alban: *See—*
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Harrison, Charles Richard: *See—*
Baker, Francis Sidney; Harrison, Charles Richard; Osborn, Anthony Raymond; and Williams, John, 3,866,077.

Harrison, Robert W., to United States of America, Atomic Energy Commission. Cermet composition containing CbC Mo and an additional carbide. 3,865,556, Cl. 29-182.700.

Hart, Donald R.: *See—*
Northup, Francis B.; and Hart, Donald R., 3,864,900.

Hartigan, Edward G., to Kendall Company, The. Belt retainer. 3,864,757, Cl. 2-114.000.

Hartop, William L., to Ortho Pharmaceutical Corporation. Expandable drug delivery device. 3,865,108, Cl. 128-260.000.

Hartstein, Eugene Fredrick; and Kendall, Ross Edward, to du Pont de Nemours, E. I., and Company. Process for milling dyes with staurolite sand. 3,865,316, Cl. 241-22.000.

Hartway, James W. Collapsible luggage handcart. 3,865,392, Cl. 280-35.000.

Hartz Mountain Corporation, The: *See—*
Lovitz, David D.; Eastman, Ness; and Davidson, William H., 3,865,082.

Hashimoto, Hiroshi; Abe, Tetsuo; and Suzuki, Masao, to Sanyo Machine Works Ltd. Method and system of servo control for speed control for vehicles. 3,866,102, Cl. 318-609.000.

Hashiue, Masakazu: *See—*
Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, 3,865,478.

Hasker, Jan; and De Klerk, Jacobus Johannes Maria Joseph, to U.S. Philips Corporation. Cathode ray gun having first and second grides with orthogonal apertures. 3,866,081, Cl. 313-449.000.

Hasler AG.: *See—*
Andermo, Nils Ingvar, 3,865,487.

Hassellof, Donald Elmer; and Scherer, Cyril George, to Stanray Corporation. Floor latch strip for railway cars. 3,865,049, Cl. 105-376.000.

Hata, Akio; and Saeki, Hiroshi, to Tokuyama Sekisui Kogyo Kabushiki Kaisha. Process for manufacturing a porous thermoplastic resin article reinforced by a glass matt. 3,865,661, Cl. 156-79.000.

Hatsukano, Yoshikazu: *See—*
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Hattori, Terumitsu: *See—*
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Haug, Werner Otto: *See—*
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Haugen, Haakon; and Dadura, James G., to Texaco Inc. Aziridine derivatives. 3,865,810, Cl. 260-239.00E.

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Hauri, Jacques: *See—*
Charransol, Pierre; Hauri, Jacques; and Athenes, Claude, 3,865,989.
Charransol, Pierre; Hauri, Jacques; and Fontana, Serge Robert, 3,865,991.

Hautemont, Jean-Claude; and Sartori, Rolland, to Rhone-Poulenc-Textile. Method for the cutting of a yarn travelling in a tube by means of a fluid. 3,864,998, Cl. 83-53.000.

Havel, Karel. Electronic keyboard for typewriter. 3,866,215, Cl. 340-365.00C.

Havens, Dale E.: *See—*
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Hawkes, Arthur Alfred: *See—*
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Hayashi, Torahiko. Automated steaming apparatus. 3,864,846, Cl. 34-189.000.

Hayes, Geoffrey. Board game apparatus. 3,865,381, Cl. 273-134.0AD.

Hayes, Richmond S., Jr., to Carrier Corporation. Refrigerant flow control device. 3,864,938, Cl. 62-504.000.

Hayes, Richmond S., Jr., to Carrier Corporation. Retaining ring. 3,865,344, Cl. 251-284.000.

Hayes, Thomas H., to RCA Corporation. Confining hand-held dispenser cap. 3,865,283, Cl. 222-402.110.

Haylock, John Christopher: *See—*
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Hazelett, Robert William: *See—*
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Healy, Francis L. Parts handler. 3,865,253, Cl. 214-1.0BT.

Hearsey, Colin John; and Mehta, Brahm Dev, to Quimco GmbH. Method of purifying secondary ammonium N,N-disubstituted thiolcarbamates. 3,865,875, Cl. 260-553.00R.

Hebbel, Gerhard; Kruger, Horst; Traser, Werner; and Pfand, Herbert, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Multiple step bleaching of cellulose with a per compound and chloride dioxide. 3,865,685, Cl. 162-78.000.

Hebert, Roy J.: *See—*
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Hecker, Wolfgang: *See—*
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Heckmann, Werner: *See—*
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Hedefine, Alfred; and Silano, Louis G., to Parson, Brinckerhoff, Quade & Douglass, Inc. Prestressed post tension suspension bridge cable anchorage. 3,864,776, Cl. 14-21.000.

Heiart, Robert Bernard: *See—*
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Heil Co., The: *See—*
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Heine, Gunter, to Gerhard Berger Fabrik Elektrischer Messgerate. Five phase stepping motor. 3,866,104, Cl. 318-696.000.

Heine, Helmut A.; Speelman, Irving A.; and Schmidt, Otto H., to Optotechnik Heine KG; and Propper Manufacturing Company, Inc. Battery-recharging device for indicating lamp. 3,866,105, Cl. 320-48.000.

Heldenbrand, Stanley W.; Johnson, David L.; and Mote, Neil H. Viewer-copier apparatus. 3,865,484, Cl. 355-45.000.

Heller, George: *See—*
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Hellner, Lars Ivar; Johansson, Hans Elof; and Norstrom, Lars-Ake, to AB Bofors. High strength, corrosion resistant, austenite-ferrite stainless steel. 3,865,644, Cl. 148-37.000.

Helmick, James C., to Victor Comptometer Corporation. Archery bow with vertically adjustable sighting device. 3,865,095, Cl. 124-24.00R.

Helmstetter, Gerald J.: *See—*
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Hemphill, Dean P.: *See—*
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Hengartner, Kurt, to Lonza Ltd. Liquid cooled plasma burner. 3,866,089, Cl. 315-111.200.

Henkel & Cie. GmbH: *See—*
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Hennessey, Russell J., to Hoerner Waldorf Corporation. Reclosable carton. 3,865,322, Cl. 229-51.0TC.

Henquet, Andre Jean: *See—*
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Henrick, Clive A.; and Siddall, John B., to Zoecon Corporation. Novel products. 3,865,852, Cl. 260-402.500.

Henrick, Clive A., to Zoecon Corporation. Aliphatic 2-4 diensic acids. 3,865,874, Cl. 260-535.00P.

Henry Simon Ltd.: *See—*
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Hercules Incorporated: *See—*
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Herolzer, Ralph H.; and Becknell, Joseph, to Vanguard Industries, Inc. Container assembly. 3,865,239, Cl. 206-507.000.

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Herrmann, Walter, to Robert Bosch, G.m.b.H. Control apparatus for hydraulic-lift tail gates of vans, and the like. 3,864,913, Cl. 60-433.000.

Hershey, Robert L. Tempo enhancement device. 3,865,001, Cl. 84-1.030.

Herwaythorn S.A.: *See—*
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Herwig, Walter; and Racky, Werner, to Hoechst Aktiengesellschaft. Flame resistant thermoplastic polyesters. 3,865,780, Cl. 260-45.7PS.

Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Frenken, Hans; Friedsam, Josef; and Meinhardt, Gunter, to Agfa-Gevaert Aktiengesellschaft. Apparatus for continuously measuring the surface temperature of moving webs. 3,864,843, Cl. 34-43.000.

Herzig, Joachim: *See—*
Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, 3,865,858.

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Herzog, Milton W., to H. Goodman & Sons, Inc. Merchandise displays and method of manufacture. 3,865,249, Cl. 211-163.000.

Herzog, Robert: *See—*
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Hess, William Emil, Jr.; and Vella-Coleiro, George Philip, to Bell Telephone Laboratories, Incorporated. Tuned oscillator circuit for providing a rotating in-plane magnetic field. 3,866,145, Cl. 331-128.000.

Hestad, Alfred, to Control Networks Corporation. Node control circuitry. 3,865,978, Cl. 179-18.0GF.

Hestad, Alfred. Matrix control circuit. 3,865,979, Cl. 179-18.0GF.

Hetrich, Wayne L., to National Public Radio. Broadcast network signaling system and method. 3,866,123, Cl. 325-53.000.

Heumann, Heinz; and Kuhmann, Helmut, to AEG-Telefunken Kabelwerke AG. Terminators for electrical superconductor cable installations. 3,865,968, Cl. 174-15.0BH.

Hewitt, Lew V., to Overhead Door Corporation. Swing door operator. 3,864,875, Cl. 49-115.000.

Hey, Hansjorg: *See—*
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Hi-Tor Inventions, Corporation: *See—*
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Hibma, Anne Marie: *See—*
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Hibma, James, to Hibma, Anne Marie. Scaffold drive and steering unit. 3,865,203, Cl. 180-2.000.

Hick, Hargreaves and Company Ltd.: *See—*
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Higbee, Wallace C.; Wilcox, Howard A.; and Jensen, Jay W., to Firestone Tire & Rubber Company, The. Inertial locking retractor. 3,865,329, Cl. 242-107.400.

Higuchi, Hobart Atsushi; and Voge, Richard Arnold, to International Business Machines Corporation. Power amplifier with self biasing and insensitivity to temperature variations. 3,866,134, Cl. 330-22.000.

Hikosaka, Mitsuo. Beacon decoder system. 3,866,221, Cl. 343-6.5LC.

Hill, Richard H., Jr. Illuminated display device. 3,864,861, Cl. 40-132.00R.

Hilti Aktiengesellschaft: *See—*
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Himmelmann, Wolfgang: *See—*
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Hinrichs, Joel H., Jr.: *See—*
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Hinze, Adrien George, to Lever Brothers Company. Hydrogenation of fatty acids and their triglycerides using a Pd(II) catalyst in an ion-exchange resin. 3,865,853, Cl. 260-409.000.
Hirai, Kenji: *See—*
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Hiraki, Hisao; and Miyagawa, Katsuhiko, to Matsushita Electric Industrial Co., Ltd. System for identifying the position of a stylus. 3,865,977, Cl. 178-19.000.
Hirano, Katsumi, to Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho. Device for compelling riders to wear seat belts on automobiles. 3,866,167, Cl. 340-52.00E.
Hirayama, Tadamasa; and Nakagawa, Kiyoshi, to Daiichi Seiyaku Co., Ltd. Pyrimidinylphrazolone derivative and process of preparing the same. 3,865,825, Cl. 260-256.40C.
Hiromichi Murata: *See—*
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Hirshon, Benedict E. Aerators with de-icing means. 3,865,908, Cl. 261-77.000.
Hishiki, Tsutomu: *See—*
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Hitachi, Ltd.: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.
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Hobart, James Lee; and Mefferd, Wayne S. Mirror mount for a laser. 3,865,472, Cl. 350-310.000.
Hobart, James Lee; and Mefferd, Wayne S., to Coherent Radiation Laboratories. Optical cavity for a laser. 3,866,140, Cl. 331-94.500.
Hobbs, James R. Duct-grille connection clip. 3,864,889, Cl. 52-753.00J.
Hodgson, Brian, to Machine Tool Divisional Services Limited. Machine tool feed and stop mechanism. 3,865,010, Cl. 90-4.000.
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Berger, Julius; Pruess, David; and Scannell, James Parnell, 3,865,694.
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Hogan, William M., to Blount & George. Surveying instrument tracking system. 3,865,491, Cl. 356-152.000.
Hogue, Noel E.: *See—*
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Holik, Herbert; and Mueller, Karl, to Escher Wyss G.m.b.H. Flotation device for a fibrous suspension. 3,865,719, Cl. 209-170.000.
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Hopkins, Neil F., to Borg-Warner Corporation. Absorption refrigeration system. 3,864,929, Cl. 62-101.000.
Hoppock, William E., to Builders Brass Works. Doorstop. 3,864,785, Cl. 16-86.00A.
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Horiuchi, Akira, to Yoshihide Fujimoto; and Akigoshi Kurihara, part interest to each. Article to be used by human females when urinating. 3,864,759, Cl. 4-110.000.
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Horton, Herbert C. Automatic centering height gauge attachment. 3,864,834, Cl. 33-169.00R.
Hounsfield, Godfrey Newbold, to EMI Limited. Penetrating radiation examining apparatus having a scanning collimator. 3,866,047, Cl. 250-360.000.
Hovind, Gary L., to Minnesota Mining and Manufacturing Company. Film retriever. 3,864,993, Cl. 81-3.00R.
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Hulyalkar, Ramchandra K., to Dart Industries Inc. Polymerization process. 3,865,772, Cl. 260-29.70H.
Hummel, Theodore W.; and Schroy, Paul C. Copper recovery process. 3,865,580, Cl. 423-32.000.
Hunicke, Raymond L.: *See—*
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Hurko, Bohdan, to General Electric Company. Molded plastic cooktop with heated glass-ceramic plate insert. 3,866,018, Cl. 219-460.000.
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Ibing, Gunther; and Haferkorn, Herbert, to Veba-Chemie Aktiengesellschaft. Recovery of citraconic acid anhydride by isomerization and vacuum distillation. 3,865,696, Cl. 203-29.000.
Ibing, Gunther: *See—*
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Immel, Waldemar; and Strauss, Wennemar, to Dr. W. Kampschulte & Cie. Galvanic nickel bath for depositing silk-dull nickel coats. 3,865,702, Cl. 204-49.000.
Imperial Chemical Industries Limited: *See—*
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Cooke, Brian Alfred, 3,865,706.
Dunkerley, Kenneth; and Kenyon, Ronald Wynford, 3,865,851.
Garner, Paul Johnson, 3,865,915.
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Jabkowski, Fridolin, to Vereinigte Osterreichische Eisen- und Stahlwerke Aktiengesellschaft. Hydraulically operable tongs for charging a workpiece to be forged. 3,865,424, Cl. 294-88.000.
Jackson, George E., to Union Carbide Corporation. Method for making a double faced warp knit fabric. 3,864,944, Cl. 66-87.000.
Jackson, Obie R., to B & J Machinery Co., Inc. Tufting machine with positive positioning means for backing material. 3,865,059, Cl. 112-79.00R.
Jacobs, Harold; and Chrepta, Metro M., to United States of America, Army. Quasi-optical integrated circuits. 3,866,143, Cl. 331-107.00R.
Jacobsen, Stephen C. Rotary-to-linear and linear-to-rotary motion converters. 3,864,983, Cl. 74-89.000.
Jacobson, Edwin B., to Jacobson Valves, Inc. Valve assembly with reciprocal float unit. 3,865,131, Cl. 137-432.000.
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Jacoby, Charles H., to International Salt Company. Geothermal energy system. 3,864,917, Cl. 60-641.000.
Jaeger, Raymond Edward; and Logan, Walter, to Bell Telephone Laboratories, Incorporated. Fabrication of glass fibers from preform by lasers. 3,865,564, Cl. 65-2.000.
Jahn, Leonard G. Material marking apparatus. 3,865,073, Cl. 118-8.000.
James, Bertram G., to Varian Associates. Collector pole piece for a microwave linear beam tube. 3,866,085, Cl. 315-3.500.
James, Michael, to Allen & Hanburys Limited. Cover for aerosol inhalating device. 3,865,279, Cl. 222-182.000.
James, Raymond Frederick, to Avon Rubber Co. Resilient side bearings. 3,865,443, Cl. 308-138.000.
Jandacek, Ronald James, to Procter & Gamble Company, The. Edible oils having hypocholesterolemic properties. 3,865,939, Cl. 424-238.000.
Janssen Pharmaceutica N.V.: *See—*
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Jay, Richard S., to Jarke Corporation. Modular storage and shipping rack. 3,865,250, Cl. 211-177.000.
Jeding, Carl-Eric Christian; and Villadsen, Vagn Hovgaard, to Aktieselskabet Thomas Ths. Sabroe & Co. Cooling pump system. 3,864,934, Cl. 62-196.000.
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Jenkins, William A., to Monarch Marking System Company. Mold assembly for making a magnetic base. 3,865,343, Cl. 249-95.000.
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Jesselallee; and Seifert, Karl-Heinrich. Pressure control during blow-moulding. 3,865,530, Cl. 425-387.00B.
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Jewett, Clifford L.: *See—*
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Jo, Seiji; and Makino, Katsuo, to Rank Xerox Ltd. Xerographic development method. 3,865,612, Cl. 117-17.500.
Johannsmeier, Karl-Heinz, to Kasker Instruments Inc. Prealignment system for an optical alignment and exposure instrument. 3,865,254, Cl. 214-1.0BH.
Johansson, Hans Elof: *See—*
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Johl, Anton; and Malich, Winfried P. H., to Louis Ethan Ltd. Folding article of furniture. 3,865,051, Cl. 108-132.000.
John C. Motter Printing Press Co.: *See—*
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Johnson, B. Neil; and Midthun, Robert A. Traveling internal conduit support. 3,865,536, Cl. 425-472.000.
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Johnson, Edgar G., Jr.: *See—*
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Johnson, Norman Allen. Carrier bunk apparatus. 3,865,400, Cl. 280-179.00R.
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Johnston, James E., to United States of America, National Aeronautics and Space Administration. Electrostatic measurement system. 3,866,114, Cl. 324-32.000.
Jolliffe, James D. Penetrating stud for snowmobiles. 3,865,441, Cl. 305-54.000.
Jones, Alan: *See—*
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Jones, Clarence O., Jr. Differential flow pressure switch for dual valve circuits. 3,865,218, Cl. 192-12.00C.
Jones, Clive, to Chrysler United Kingdom Limited. Front suspension assemblies for motor vehicles. 3,864,989, Cl. 74-498.000.
Jones, Dennis G.: *See—*
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Jones, Wayne D. Automatic sprinkler control device. 3,865,138, Cl. 137-624.120.
Jones, William Clifford, Jr., to General Steel Industries, Inc. Railway vehicle truck with device for damping oscillations about swivel axis. 3,865,045, Cl. 105-199.00C.
Jonkoff, Imre Mirko: *See—*
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Joslyn Mfg. and Supply Co.: *See—*
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Joy, David Richard, to Imperial Chemical Industries Limited. Process for the production of petroleum resins of varying softening points. 3,865,797, Cl. 260-82.000.
Juillet, Francois: *See—*
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Jung, Botho. Watch with an adjustable time interval hand. 3,864,904, Cl. 58-22.900.
Jung, George Christian, to RCA Corporation. Four-port junction circulator having larger diameter conductive post contacting gyromagnetic post. 3,866,149, Cl. 333-1.100.
Jung, Horst: *See—*
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Jungo, Markus: *See—*
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Jurd, Leonard; King, A. Douglas, Jr.; and Stanley, William L., to United States of America, Agriculture. Cinnamyl phenol antimicrobial agents. 3,865,748, Cl. 252-404.000.
Jursich, Myron J.; and Randich, Gail T., to Nalco Chemical Company. Method of improving the retention of filler and fiber fines in papermaking processes by using an acrylamide terpolymer. 3,865,686, Cl. 162-168.000.
Kaak, Stephanus W. Multi-floor conveyor and storage apparatus. 3,865,227, Cl. 198-84.000.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Yoshino, Takao, 3,865,510.

Kabushiki Kaisha Seikosha: *See—*
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Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
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Kadakia, Virendra K., to Honeywell Information Systems, Inc. Apparatus and method for bidirectional shift register operation. 3,866,023, Cl. 235-92.0SH.
Kaelin, Bette M., to Marvin Glass & Associates. Hand manipulatable figure toy. 3,864,871, Cl. 46-154.000.
Kaelin, Joseph Richard. Method for introduction and circulation of oxygen or oxygenous gas in a liquid which is to be clarified, and apparatus for carrying out the method. 3,865,721, Cl. 210-7.000.
Kaempfer, Knut: *See—*
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Kaiser Gypsum Company, Inc.: *See—*
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Kallrath, Gottfried: *See—*
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Kalopissis, Gregoire; and Vanlerberghe, Guy, to Societe Anonyme dite: L'Oreal. Hair dyeing compositions containing polyhydroxylated polyether nonionic surfactants. 3,865,542, Cl. 8-10.100.
Kamijo, Hirotaka: *See—*
Okumura, Shinji; Yoshinago, Fumihiro; Kubota, Koji; and Kamijo, Hirotaka, 3,865,690.
Kammholz, Gunther: *See—*
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Kamoshita, Katsuzo: *See—*
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Kanai, Hiroshi; and Kimura, Yuji, to Kanai, Hiroshi; and Kimura, Yuji. Apparatus for measuring blood pressure. 3,865,100, Cl. 128-2.05D.
Kanamori, Toshiaki: *See—*
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Kane, William P., to du Pont de Nemours, E. I., and Company. Container for cooking food therein. 3,865,302, Cl. 229-43.000.
Kaneda, Isao; and Takeuchi, Kiyokazu, to New Nippon Electric Company Ltd. Discharge lamp starter device using a backswing voltage booster and characterized by the absence of a preheating function. 3,866,088, Cl. 315-105.000.
Kanegafuchi Boseki Kabushiki Kaisha: *See—*
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Kanisawa, Hideo: *See—*
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Kano, Hideo; Ogata, Masaru; and Yukinaga, Hisajiro, to Shionogi & Co., Ltd. Quinone derivatives and compositions containing the same. 3,865,835, Cl. 260-296.00R.
Kanzelberger, James C., to Contemporary, Inc. Support for frame, plaque, or the like. 3,865,342, Cl. 248-470.000.
Kaplan, Isaac: *See—*
Sharon, Uzi; and Kaplan, Isaac, 3,865,113.
Kasahara, Tadashi; and Kimura, Yoshiaki, to Konishiroku Photo Industry Co. Ltd. Focused-image hologram memory. 3,865,464, Cl. 350-3.500.
Kasker Instruments Inc.: *See—*
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Kasper, Werner: *See—*
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Katagiri, Kotaro; and Nakamura, Yoshio, to Shinetsu Chemical Company. Sintered plate of polyvinyl chloride resin and method of making the same. 3,865,799, Cl. 260-92.80A.
Katayama, Kiyoji: *See—*
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Kato, Kazunobu: *See—*
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Kato, Makoto, to Matsushita Electric Industrial Co., Ltd. Holographic audio signal recording and playback apparatus. 3,865,996, Cl. 179-100.30G.
Katsuyama, Yoshihisa: *See—*
Horie, Toshio; Yoshida, Kazuaki; Hori, Hisako; and Katsuyama, Yoshihisa, 3,865,871.
Katz, Jerome, to Delaware Photographic Products, Inc. General purpose developer. 3,865,591, Cl. 96-66.300.
Kaufman, Len. Perpetual calendar. 3,864,859, Cl. 40-107.000.
Kawabata, Shigeo: *See—*
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Kawaguchi, Isao, to NHK Spring Co., Ltd. Clip fastening device. 3,864,804, Cl. 29-211.00M.
Kawai, Yoshio; Asano, Kiro; and Yamaki, Kiyoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Carbonaceouss reagent for carbonaceous binder used in the manufacture of fired carbon articles and carbon-bonded refractories. 3,865,713, Cl. 208-6.000.
Kawakami, Izumi: *See—*
Kobayashi, Masaki; Kawakami, Izumi; and Gunji, Katuhiko, 3,866,155.
Kawamata, Yukio; Yamamoto, Keisuke; and Mouri, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Remote control utilizing pulsed beam of light frequency. 3,866,177, Cl. 340-171.00R.
Kawiecki, Chester J., to Joslyn Mfg. and Supply Co. Unitary series spark gap with aligned apertures. 3,866,091, Cl. 315-203.000.
Kay, Edward L.: *See—*
Lohr, Delmar F., Jr.; and Kay, Edward L., 3,865,781.
Kayamori, Hisashi: *See—*
Arai, Mamoru; Itoh, Yashuhiro; Nakahara, Masaki; Kayamori, Hisashi; and Sugawara, Shinichi, 3,865,693.
Kazama, Ken; Ohno, Kunio; Umegae, Mamoru; and Yonei, Mineko, to Asahi Kasei Kogyo Kabushiki Kaisha. Dress form of cellular double layer of thermoplastic materials. 3,865,284, Cl. 223-68.000.
Kazokas, George P.: *See—*
United States of America, National Aeronautics and Space Administration; and Kazokas, George P., 3,864,960.
Keil, Joseph W., to Dow Chemical Corporation. Dyeing with foam control composition of silica, polyoxypropylenes and polydimethylsiloxane. 3,865,544, Cl. 8-93.000.
Keldany, Rachid, to Ruti Machinery Works, Ltd. Device for storing a thread portion. 3,865,149, Cl. 139-122.00R.
Kellams, Roger W.; and Dyer, Clarence H., to General Motors Corporation. Electrostatic fluid bed powder coating system. 3,865,079, Cl. 118-621.000.
Kellermeier, Robert J.; Knight, James T.; and Steljes, Bernadine E., to Ore-Ida Foods, Inc. Coating the surface of frozen, fried french fries with atomized fat globules. 3,865,964, Cl. 426-307.000.
Kelly, Francis J., to United States of America, Navy. Satellite transmitter of ULF electromagnetic waves. 3,866,231, Cl. 343-705.000.
Kels Marine, Inc.: *See—*
Fiegel, Harry J., Jr.; and Thatcher, Russell S., 3,864,812.
Kemp, Paul Clifford, to Continental Oil Company. Process for preparing highly-basic, magnesium-containing dispersion. 3,865,737, Cl. 252-33.400.
Kendall Company, The: *See—*
Hartigan, Edward G., 3,864,757.
Vida, Julius A., 3,865,941.
Kendall, Ross Edward: *See—*
Hartstein, Eugene Fredrick; and Kendall, Ross Edward, 3,865,316.
Kennametal Inc.: *See—*
Crosby, Melvin A., 3,865,437.
McCreery, James F.; and Jones, Dennis G., 3,864,799.
Kennard, Harry M.: *See—*
Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.
Kennecott Copper Corporation: *See—*
Neumann, Norbert F.; and Crimes, Peter B., 3,865,573.
Kennedy, Carl D.: *See—*
Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., 3,865,735.
Kenton, Joseph R.: *See—*
Banks, Robert L.; and Kenton, Joseph R., 3,865,751.
Kenyon, Ronald Wynford: *See—*
Dunkerley, Kenneth; and Kenyon, Ronald Wynford, 3,865,851.
Kerbit Pty. Ltd.: *See—*
Rochfort, William P. K., 3,864,858.
Keren, William M.; and Loniello, Peter J., to Sola Basic Industries, Inc. Box furnace. 3,866,017, Cl. 219-390.000.
Kerman, Stephen; and Shinoi, Tsuyoshi, to Nippon Tsu Shin Kogyo K.K.; and TIE/Communications Inc. Universal subscriber's line circuit in a key telephone system. 3,865,995, Cl. 179-99.000.
Kern, Herbert, to Friedrich Boysen, Firma. Thermal reactor with relatively movable internal pipe sections. 3,864,909, Cl. 60-282.000.
Kerr, John Anthony: *See—*
Shannon, John Martin; and Kerr, John Anthony, 3,865,633.
Kerreneur, Alain Roger: *See—*
Delgendre, Jacques Claude; Kerreneur, Alain Roger; and Berton, Georges Albert, 3,865,037.
Kerscher, William J., III; and Crawford, Daniel A., to General Motors Corporation. Digital multigage for motor vehicle. 3,866,166, Cl. 340-52.00F.
Kershaw, Justin A., Jr.: *See—*
Cebula, Leonard A.; Fitzpatrick, Joseph F., Jr.; and Kershaw, Justin A., Jr., 3,866,126.
Kesselman, David A.: *See—*
Lieb, Philip C.; and Kesselman, David A., 3,865,245.
Lieb, Philip C.; and Kesselman, David A., 3,865,246.
Kessler, Stanley. Elapsed event recorder. 3,866,021, Cl. 235-92.0EA.
Kester, Melvin E., to Canon Mills Co. Display and carrying package for flat, flexible merchandise. 3,865,234, Cl. 206-45.330.

Kew, Jeffrey: *See—*
Bendall, Dennis M.; Harris, William R.; Summers, Peter; Pyart, Raymond S.; Kew, Jeffrey; Sherborne, Michael C. D.; Caldwell, Alistair J.; Thorp, Peter M.; and Jones, John A., 3,865,482.

Key Equipment Company: *See—*
Davis, Walter L.; and Svehaug, Henry V., 3,865,965.

Keyes Fibre Company: *See—*
Crabtree, Kenneth L., 3,865,299.

Kielpikowski, Klemence: *See—*
Dennis, Roy James; and Kielpikowski, Klemence, 3,865,065.

Kiesel, Joseph Anthony: *See—*
Levy, Leonard P.; Kiesel, Joseph Anthony; and Honig, Murray H., 3,865,235.

Kikkoman Shoyu Co., Ltd.: *See—*
Fukushima, Danji; Hattori, Terumitsu; and Arai, Akira, 3,865,956.

Kilbourn, Edward E.: *See—*
Ware, J. Edgar, Jr.; Kilbourn, Edward E.; and Peardon, David L., 3,865,931.

Kilian, Ernst-August, to U.S. Philips Corporation. Circuit arrangement for a receiver for frequency-modulated signals having variable attenuation phase shifter. 3,866,125, Cl. 325-348.000.

Kilstrom, Lars Gunnar; and Ridderstrom, Goran Arvid Henning, to Aktebolaget Electrolux. Surface treating attachment device. 3,864,784, Cl. 15-380.000.

Kimberly-Clark Corporation: *See—*
Roeder, Robert J., 3,865,112.

Kimura, Kouichi: *See—*
Aihara, Toru; and Kimura, Kouichi, 3,865,209.

Kimura, Yoshiaki: *See—*
Kasahara, Tadashi; and Kimura, Yoshiaki, 3,865,464.

Kimura, Yuji: *See—*
Kanai, Hiroshi; and Kimura, Yuji, 3,865,100.

Kinespherics, Inc.: *See—*
Martinozzi, Giulio, 3,864,982.

King, A. Douglas, Jr.: *See—*
Jurd, Leonard; King, A. Douglas, Jr.; and Stanley, William L., 3,865,748.

Kingsly, Walter D. Dual bicycle coupling kit. 3,865,401, Cl. 280-209.000.

Kinoshita, Shushi: *See—*
Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, 3,865,636.

Kirkevold, Kent A.: *See—*
Roden, John S.; Kirkevold, Kent A.; Tritle, Gary L.; and Sjerven, Gene A., 3,865,627.

Kirkman, Earl L., to HLS Industries. Apparatus for chemically depositing epitaxial layers on semiconductor substrates. 3,865,072, Cl. 118-4.000.

Kirsch, Francis William; Barmby, David S.; and Potts, John D., to Sun Oil Company of Pennsylvania. Process for paraffin-olefin alkylation. 3,865,894, Cl. 260-683.430.

Kiscaden, Roy W.: *See—*
Yannone, Robert A.; and Kiscaden, Roy W., 3,866,108.

Kiszelly, Eniko: *See—*
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Kitchin, Oscar G.: *See—*
Epner, Elliot J.; Kitchin, Oscar G.; and Sampatacos, Peter M., 3,865,394.

Klassen, James G. Hitch pin. 3,865,407, Cl. 280-515.000.

Kleimola, Frank W. Passive containment system. 3,865,688, Cl. 176-37.000.

Klein-Doepke, Wolfgang; Elser, Wilhelm; Quis, Peter; and Rossberg, Peter, to Rohm GmbH. Resinous coating compositions hardenable by high energy radiation. 3,865,901, Cl. 260-871.000.

Klein, James H.; Romano, Anthony J.; Kukacka, Lawrence E.; and Fedelem, Joseph J., to United States of America, Atomic Energy Commission. Slab impregnation apparatus. 3,865,075, Cl. 118-50.000.

Klein, Melvin, to International Business Machines Corporation. On-line detection and measurement of contaminating gases during filling of gas display panels. 3,865,489, Cl. 356-85.000.

Kleinschmidt, Klaus; and Proudfoot, David, to Junger, Miguel C. Structural block with septum. 3,866,001, Cl. 181-33.00G.

Kleist, Dale, to Owens-Corning Fiberglas Corporation. Method and apparatus for producing and collecting fibers. 3,865,566, Cl. 65-6.000.

Klett, Gene R.; Bedford, Billy R.; and Casey, Thomas P., to Caterpillar Tractor Company. Quick disconnect cutting edge for earthworking implements. 3,864,853, Cl. 37-141.00T.

Klett, Stanley D.: *See—*
Charland, Terrence D.; and Klett, Stanley D., 3,865,081.

Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., to Foote Mineral Company. Method of adding manganese to aluminum. 3,865,583, Cl. 75-138.000.

Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., to Foote Mineral Company. Articles for adding manganese to aluminum. 3,865,584, Cl. 29-191.200.

Klingler, Thomas C.: *See—*
Goralski, Christian T.; and Klingler, Thomas C., 3,865,822.

Klomp, Johannes Theodorus; Van De Ven, Adrianus Johannes Cornelis; and Berka, George B., to U.S. Philips Corporation. Method of sealing a metal article to a glass or ceramic article in a vacuum-tight manner. 3,865,567, Cl. 65-43.000.

Klukos, Edward O. Machine for indexing and screw-mounting objects to a work piece. 3,864,805, Cl. 29-211.00R.

Knabe, Uwe; Heckmann, Werner; and Rademacher, Friedrich, to Holstein & Kappert Maschinenfabrik Phonix GmbH. Filling of containers with liquids which are deleteriously influenced by contact with air. 3,865,157, Cl. 141-7.000.

Knecht, Rudolf: *See—*
Risi, Walter; and Knecht, Rudolf, 3,864,796.

Kniep, Joris, to International Technische Handelsonderneming en Adviesbureau "ITHA" N.V. Method and device for soil compacting. 3,865,501, Cl. 404-133.000.

Knight, James T.: *See—*
Kellermeier, Robert J.; Knight, James T.; and Steljes, Bernadine E., 3,865,964.

Knight, Lindsay Charles. Moving target trolley, moving target, and target range. 3,865,373, Cl. 273-105.200.

Knodel, Louis Robert, to Dow Chemical Company, The. Low viscosity, low equivalent weight polyether polyols and a method for their preparation. 3,865,806, Cl. 260-209.00R.

Knudson, John O.: *See—*
Cherney, Thomas M.; and Knudson, John O., 3,865,460.

Kobayashi, Masaki; Kawakami, Izumi; and Gunji, Katuhiko, to Oki Electric Industry Co., Ltd. Attenuation pole type monolithic crystal filter. 3,866,155, Cl. 333-72.000.

Kobayashi, Teruo; Inoue, Kazuo; and Sawaguchi, Hiroshi, to Fuji Photo Film Co., Ltd. Oxonol dyes and process for preparing oxonol dyes. 3,865,817, Cl. 260-240.200.

Kobe, Joze; O'Brien, Darrell E.; and Robins, Roland K., to ICN Pharmaceuticals, Inc. 2-Aryl-7-substituted pyrazolo (1,5*a*) 1,3,5-triazines. 3,865,824, Cl. 260-248.0NS.

Kobe Steel, Limited: *See—*
Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, 3,865,636.

Koch, James H., to N. L. Industries, Inc. Method of making a lined die casting by employing a transplant coating. 3,864,815, Cl. 29-527.300.

Koehring Company: *See—*
Neslon, Albert W., 3,865,195.
Wilke, Raud A., 3,865,386.

Koenig, William E.; and Cunningham, James T., to Litton Systems, Inc. Plow scraper for conveyor belts. 3,865,232, Cl. 198-230.000.

Kohler, Jacques R.; and Van Amerongen, Gerrit J., to Shell Oil Company. Friction reduction. 3,865,124, Cl. 137-13.000.

Kohn, Heinz, to Babcock & Wilcox Limited. Tube fitting. 3,865,083, Cl. 122-235.00R.

Kolb, James M.: *See—*
Schenker, Barry A.; Kolb, James M.; and Franks, Charles R., 3,865,703.

Kolell, Norbert C.: *See—*
McGee, John K.; and Kolell, Norbert C., 3,866,179.

Kolster, Harvey L.: *See—*
Donovan, Robert W.; Kolster, Harvey L.; Broeker, Herbert H.; and Bailey, George W., 3,865,248.

Kolze, Bruce Alan; and Kolze, Melvin W. Particulate waste product firing system. 3,865,053, Cl. 110-7.00A.

Kolze, Melvin W.: *See—*
Kolze, Bruce Alan; and Kolze, Melvin W., 3,865,053.

Komatsu, Akira: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,865,888.

Komatsu, Isao: *See—*
Tajima, Mutsunari; and Komatsu, Isao, 3,866,151.

Kommanditbolaget United Stirling (Sweden) AB & Co.: *See—*
Hakansson, Sven, 3,865,015.

Kondo, Hiroshi. Pressure accumulative sprayer device. 3,865,313, Cl. 239-333.000.

Kondo, Kaneichi: *See—*
Ishii, Akira; Kondo, Kaneichi; and Uchibori, Kenichi, 3,866,069.

Kondou, Toshihito: *See—*
Shimizu, Syozo; Shinohara, Hiroshi; Kondou, Toshihito; and Yamada, Norimasa, 3,865,617.

Kongelbeck, Sverre, to United States of America, Navy. Launcher mount. 3,865,009, Cl. 89-1.815.

Konig, Ferdinand, to Sulzer Brothers Limited. Analogue function generator. 3,866,031, Cl. 235-197.000.

Konishiroku Photo Industry Co. Ltd.: *See—*
Kasahara, Tadashi; and Kimura, Yoshiaki, 3,865,464.

Koniskinoku Photo Industry Co., Ltd.: *See—*
Furuya, Tetsuo; Ibe, Yoshio; and Kanisawa, Hideo, 3,865,596.

Kononenko, Vadim Grigorievich: *See—*
Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna, 3,864,996.

Kooi, Else; and Hoeberechts, Arthur Marie Eugene, to U.S. Philips Corporation. Method of making a target for a camera tube with a mosaic of regions forming rectifying junctions. 3,864,818, Cl. 29-578.000.

Koontz, Harry S.: *See—*
Reese, Thomas J.; and Koontz, Harry S., 3,865,680.

Koppers Company, Inc.: *See—*
Williams, Olin E., 3,865,579.

Korn, Meyer. Bag and closure. 3,865,303, Cl. 229-62.000.

Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, to EGYT Gyogyszervegyeszeti Gyar. N-Picolinoyl-piperazines. 3,865,828, Cl. 260-268.00C.

Korsloot, Jacob Gerard: *See—*
Boschman, Theodorus Antonius Cornelis; and Korsloot, Jacob Gerard, 3,865,832.

Korth, Hans E., to International Business Machines Corporation. Apparatus for measuring surface flatness. 3,866,038, Cl. 250-236.000.

Kosai, Yoshio: *See—*
Horlle, Shigeki; Fujii, Chiyuki; and Kosai, Yoshio, 3,865,882.

Koshiba, Masao: *See—*
Yamamoto, Michihiro; Ishizumi, Kikuo; Mori, Kazuo; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 3,865,827.

Kosinsky, Nathan. Pest control device. 3,864,866, Cl. 43-58.000.

Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., to Auric Corporation. Process for intermittent electroplating strips. 3,865,698, Cl. 204-15.000.

Kotlan, Johannes: *See—*
Kwizda, Richard; and Kotlan, Johannes, 3,865,940.

Koundakjian, Theodore H., to Chevron Research Company. Dry stable phosphorothioate insecticide formulations. 3,865,937, Cl. 424-218.000.

Kralik, Andrew J.: *See—*
DiMarco, Bernard; and Kralik, Andrew J., 3,866,156.

Kramer, David A.; and Lavas, George P., to Hughes Aircraft Company. Radar system with target illumination by different waveforms. 3,866,219, Cl. 343-5.00R.

Kramer, Leo; and Harris, Harold E., Jr., to Ingersoll-Rand Company. Rotary motor with fluid pressure biased vane. 3,865,520, Cl. 418-82.000.

Kramer, Wayne C.: *See—*
Augustin, Michael J.; Kramer, Wayne C.; and Treanor, Robert M., 3,866,136.

Krankota, Jan L.: *See—*
Roy, Prodyot; and Krankota, Jan L., 3,865,709.

Krapcho, John; and Turk, Chester F., to E. R. Squibb & Sons, Inc. Substituted benzoxazines. 3,865,818, Cl. 260-240.00F.

Kratzer, Beat. Method for fabricating a natural fertilizer. 3,865,568, Cl. 71-21.000.

Krause, Melvin G., to Rockwell International Corporation. Signal comparator with programmed threshold. 3,866,130, Cl. 328-147.000.

Krause, Richard P. Bar handling apparatus. 3,865,255, Cl. 214-1.0BB.

Krauss-Maffei Aktiengesellschaft: *See—*
Schwarzler, Peter, 3,865,043.

Krehbiel, Delmar D.: *See—*
Clark, Charles R.; Gregory, M. Duane; Krehbiel, Delmar D.; Butler, Claud D.; and Kennedy, Carl D., 3,865,735.

Kreidel, Rudolf: *See—*
Rovin, Herman; Kreidel, Rudolf; and Levine, Lawrence J., 3,865,058.

Kreienbuhl, Claude: *See—*
Thevenaz, Jean; and Kreienbuhl, Claude, 3,865,476.

Krell, Karl-Heinz: *See—*
Schlafer, Ludwig; and Krell, Karl-Heinz, 3,865,543.

Krenicki, Joseph; and Hunicke, Raymond L., to Lewis Corporation. Frequency varying oscillator circuit vibratory cleaning apparatus. 3,866,068, Cl. 310-8.100.

Krenzel, Ronald W., to Electronic Associates Inc. Tire load force variation testing system. 3,864,967, Cl. 73-146.000.

Krenzer, John, to Velsicol Chemical Corporation. Dialkyl acetals of heterocyclic ureidoacetaldehyde. 3,864,775, Cl. 71-90.000.

Kronsder, Hermann. Labeling device for upright standing objects. 3,865,671, Cl. 156-488.000.

Kropiwnicki, Tadek M., to Carrier Corporation. Valve plate for reciprocating compressor. 3,865,345, Cl. 251-367.000.

Kruger, Horst: *See—*
Hebbel, Gerhard; Kruger, Horst; Traser, Werner; and Pfand, Herbert, 3,865,685.

Krumm, Charles G.: *See—*
Stiefel, Richard; and Krumm, Charles G., 3,865,297.

Krutak, James J., Sr., to Eastman Kodak Company. Process for preparing fischer's base. 3,865,837, Cl. 260-326.11R.

Ku, Ta-Cheng; and Tsao, Sherman H. M., to International Business Machines Corporation. Ink spray printer. 3,865,031, Cl. 101-114.000.

Kubick, Mark: *See—*
Melnick, Dennis M.; and Kubick, Mark, 3,865,024.
Melnick, Dennis M.; and Kubick, Mark, 3,865,391.

Kubini, Jakob: *See—*
Mobius, Hans Eberhard; Kubini, Jakob; and Soraya, Sorayapour, 3,865,640.

Kubo, Shugo: *See—*
Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, 3,865,971.

Kubota, Koji: *See—*
Okumura, Shinji; Yoshinago, Fumihiro; Kubota, Koji; and Kamijo, Hirotaka, 3,865,690.

Kuehn, Erich; and Wyhof, John R., to ICI United States Inc. Water-soluble dielectric resins. 3,865,869, Cl. 260-47.00C.

Kuenemund, Friedrich, to Siemens Aktiengesellschaft. Radio relay systems. 3,865,990, Cl. 179-15.0FD.

Kuhmann, Helmut: *See—*
Heumann, Heinz; and Kuhmann, Helmut, 3,865,968.

Kuhn, Falk, to Fouquet-Werk Frauz & Planck, Firma. Multifeed circular knitting machine. 3,864,941, Cl. 66-50.00B.

Kuhns, John P., to Gearhart-Owen Industries, Inc. Spare tire mount. 3,865,264, Cl. 214-451.000.

Kuiff, Siegfried: *See—*
Roth, Mario; Siemonsen, Hans Peter; Kuiff, Siegfried; and Moebs, Heinz, 3,865,558.

Kukacka, Lawrence E.: *See—*
Klein, James H.; Romano, Anthony J.; Kukacka, Lawrence E.; and Fedelem, Joseph J., 3,865,075.

Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, to Nippon Telegraph and Telephone Public Corporation. Submarine coaxial cables. 3,865,971, Cl. 174-102.00R.

Kumobayashi, Hidenori: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,865,888.

Kung, Charles K. H.: *See—*
Chiba, Shyozo; Kung, Charles K. H.; and Goldwasser, Eugene, 3,865,801.

Kurahashi, Koichiro; Tottori, Hiroshi; and Isogai, Fumihiko, to Mitsubishi Denki Kabushiki Kaisha. Plasma display panel device. 3,866,084, Cl. 313-510.000.

Kurahashi, Masayuki: *See—*
Nakayama, Shozo; and Kurahashi, Masayuki, 3,864,801.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Kawai, Yoshio; Asano, Kiro; and Yamaki, Kiyoshi, 3,865,713.

Kurilenko, Viktor Kharitonovich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Kusters, Norbert L.; and MacMartin, Malcolm P. Low leakage electrical power input circuit for electromedical and other similar apparatus. 3,866,093, Cl. 317-18.00R.

Kutsenko, Petr Ivanovich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev; Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Kuwada, Yutaka: *See—*
Meguro, Kanji; and Kuwada, Yutaka, 3,865,811.

Kwizda, Richard; and Kotlan, Johannes, to F. Joh. Kwizda. Pharmaceutical preparation. 3,865,940, Cl. 424-242.000.

La Societe Civile Agricole de Mycelium du Centre Ouest (S.C.A.M.Y.C.O.): *See—*
Massier, Pierre, 3,865,695.

Labbe, Francis Auguste Maurice: *See—*
Molins, Desmond Walter; Labbe, Francis Auguste Maurice; and Perkins, Clive, 3,865,121.

Labib, Ahmed H.: *See—*
DeGiorgio, John A.; Labib, Ahmed H.; and Rane, Subhash R., 3,866,206.

Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, to Lever Brothers Company. Multistation process for manufacturing hollow bodies. 3,865,913, Cl. 264-40.000.

Lacoste, Gerard H., to Herwaythorn S.A. Gear torque transmission boxes. 3,864,990, Cl. 74-606.00R.

Laforest, Pierre: *See—*
Gagnon, Pierre; and Laforest, Pierre, 3,865,025.

LaHaye, Paul G. Dry insulated parts and method of manufacture. 3,864,908, Cl. 60-272.000.

Laigle, Roger E.; and Lozano, Luis J., to Anaconda Company, The. Skiving apparatus with laterally floating support platform for producing multi-gauge metal strip of uniform width. 3,865,012, Cl. 90-24.00F.

Lake Chemical Company: *See—*
Aronberg, Lester, 3,865,641.

Lambiel, Jean-Claude: *See—*
Stark, John-Hermann; Lambiel, Jean-Claude; and Jungo, Markus, 3,864,962.

Lamoria, Lz F.: *See—*
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Lancini, Giancarlo: *See—*
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Landry, Charles A.: *See—*
Callahan, Joseph W.; and Landry, Charles A., 3,865,628.

Lane, George A.: *See—*
Flynn, James P.; Lane, George A.; and Plomer, John J., 3,865,656.
Flynn, James P.; Lane, George A.; and Plomer, John J., 3,865,659.

Langbein, Adolf: *See—*
Merz, Herbert; Langbein, Adolf; Wick, Helmut; and Stockhaus, Klaus, 3,865,943.

Langdon, Roy A.; and Gerschon, Wilfried R., to Beloit Corporation. Two piece die assembly for extruding micro-filaments. 3,865,535, Cl. 425-464.000.

Lange, Ronald E., to Honeywell Information Systems, Inc. Communications control apparatus for the use with a cache store. 3,866,183, Cl. 340-172.500.

Langewis, Cornelis, to Kaiser Aluminum & Chemical Corporation. Can trimmer device. 3,864,995, Cl. 82-54.000.

Langford, Frederic E., to Formac International Inc. System and method for balloon yarding and otherwise transporting objects between two locations. 3,865,251, Cl. 212-71.000.

Lannert, Kent P., to Monsanto Company. Detergent composition. 3,865,755, Cl. 252-558.000.

Lapham, Jerome F., Jr.; and Mataya, John A., to Sprague Electric Company. Method of making capacitor and resistor for monolithic integrated circuits. 3,864,817, Cl. 29-577.000.

Lappin, Terry A.: *See—*
Ridgway, John A., Jr.; Lappin, Terry A.; Benjamin, Benny Moses; Corns, Joseph B.; and Akin, Cavit, 3,865,691.

Larionov, Leonid Ivanovich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Larker, Hans; and Nilsson, Jan, to Allmanna Svenska Elektriska Aktiebolaget. High pressure seal. 3,865,387, Cl. 277-190.000.

Larson, Jay Michael: *See—*
Volin, Timothy Earl; Benjamin, John Stanwood; Larson, Jay Michael; and Cairns, Robert Lacock, 3,865,575.

Laser Industries, Ltd.: *See—*
Sharon, Uzi; and Kaplan, Isaac, 3,865,113.
Sharon, Uzi, 3,865,114.

Lasscock, Jack Edward, to Stratco Metal Proprietary Limited. Gutter suspension means. 3,864,882, Cl. 52-11.000.

Lasswell, Fred D. Spindle for fruit picker. 3,864,899, Cl. 56-328.00R.

Latham, James Albert, to British Steel Corporation. Method of melting solid charges in open hearth furnace. 3,865,576, Cl. 75-43.000.

Lavas, George P.: *See—*
Kramer, David A.; and Lavas, George P., 3,866,219.

Lavoie, Gilbert V. Screw conveyor hanger bearing. 3,865,444, Cl. 308-187.100.

Lawton, Richard A. Annunciator circuit. 3,866,194, Cl. 340-213.00R.

Lay Nee Konya: *See—*
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Lear Siegler, Inc.: *See—*
Young, David W., 3,866,218.

Lebedeva, Valentina Ivanovna: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 3,865,891.

Leberzammer, Ernst: *See—*
Freeman, John Thomas; Heiart, Robert Bernard; and Leberzammer, Ernst, 3,865,589.

Lebrun, Dean: *See—*
Desvignes, Francois; Hybois, Raymond; and Lebrun, Dean, 3,866,046.

LeCardonnel, Gerard Marcel: *See—*
Bouty, Lucien Robert; and LeCardonnel, Gerard Marcel, 3,865,992.

Lecluse, Willem Jan, to Cooperatieve Condensfabriek "FRIESLAND". Edible protein fibers based on casein and a process for preparing same. 3,865,959, Cl. 426-212.000.

Ledebur, Harry C.; and Wilson, Harold R., to Wean United Inc. Apparatus for machining pilger rolls and the like. 3,864,878, Cl. 51-50.0PC.

Lee, Choong-Gil, to Lee & Lee Research Laboratories. Rotary internal combustion engine. 3,865,086, Cl. 123-8.450.

Lee & Lee Research Laboratories: *See—*
Lee, Choong-Gil, 3,865,086.

Lee, Sung Ki, to Hooker Chemicals & Plastics Corporation. Copolymers and terpolymers and polyamide-polyesters. 3,865,792, Cl. 260-78.00R.

Leemann, Karl. Diving time measuring device. 3,864,977, Cl. 73-389.000.

Lefevre, Marcel R., to Research-Cottrel, Inc. Cooling tower type waste heat extraction method and apparatus. 3,865,911, Cl. 261-140.000.

Legendre, Serge, to Essilor International (Compagnie Generale d'Optique). Apparatus for casting a holding block on an ophthalmic lens. 3,865,178, Cl. 164-334.000.

Legille, Edouard, to S.A. Des Anciens Etablissements Paul Wurth. Control device for a distributor chute in a shaft furnace, particularly a blast furnace. 3,864,984, Cl. 74-89.150.

Lehker, Wayne H.: *See—*
Palenchar, Daniel P.; Lehker, Wayne H.; and Lock, David P., 3,866,100.

Lehureau, Jean: *See—*
Rieux, Jean-Philippe; and Lehureau, Jean, 3,865,705.

Leiblich, Gordon Francis. Fence dropper. 3,865,349, Cl. 256-47.000.

Leitner, Kajetan. Spring clips. 3,864,789, Cl. 24-73.0MF.

Lenhart, Helga: *See—*
Diener, Horst; Lenhart, Helga; and Seifried, Walter, 3,865,626.

Lenke, Paul W.: *See—*
Mojonnier, Albert B.; and Lenke, Paul W., 3,865,304.

Lenssen, Gerhard, to Rheinisch-Westfalisches Elektrizitatswerk AG. Power-generating system and method. 3,866,058, Cl. 290-52.000.

Lent, William E.: *See—*
Gates, Louis E., Jr.; Lent, William E.; and Flores, Jose A., 3,866,234.

Lente, Miklos. Method of making motion pictures. 3,865,738, Cl. 352-44.000.

Leonard, Joseph A., to Raymond Lee Organization, Inc., The, a part interest. Device for brushing dentures. 3,864,781, Cl. 15-106.000.

Lepelletier, Pierre Andre Georges, to Societe Anonyme Francaise du Ferodo. Hydrostatic unit and its applications. 3,865,519, Cl. 418-61.000.

Lepetit S.p.A. Gruppo per la Ricerca Scientifica e la produzione Chemica Farmaceutica: *See—*
Cavalleri, Bruno; Bellasio, Elvio; Testa, Emilio; and Maffii, Giulio, 3,865,847.

Lepper, Herbert: *See—*
Dohr, Manfred; Zeidler, Ulrich; and Lepper, Herbert, 3,865,856.

Lesokhin, Jury Abramovich; and Ivlev, Anatoly Grigorievich. Method of controlling the efficiency of blade hydromachines with considerable head variations. 3,865,507, Cl. 416-1.000.

Letot, Incorporated: *See—*
Stankus, Robert W., 3,865,985.

Leuenberger, Urs, to Canada Wire and Cable Limited. Rotatable object with positive lock and means to unlock and rotate said object. 3,864,869, Cl. 46-78.000.

Lev, Jaroslav; and Kakac, Karel, to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi. Mechanism for the return movement of heald shafts of a weaving loom. 3,865,147, Cl. 139-1.00E.

Lever Brothers Company: *See—*
Hinze, Adrien George, 3,865,853.
Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, 3,865,913.
Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, 3,865,952.

Levey, Gustave S.; and Moser, Edward, to said Levey, by said Moser. Adjustable pattern spray gun. 3,865,314, Cl. 239-590.300.

Levey, Gustave S.: *See—*
Levey, Gustave S.; and Moser, Edward (assors. to said Levey, by said Moser), 3,865,314.

Levine, Lawrence J.: *See—*
Rovin, Herman; Kreidel, Rudolf; and Levine, Lawrence J., 3,865,058.

Leviton Manufacturing Co., Inc.: *See—*
Lopez, Juan M., 3,865,453.

Levy, Leonard P.; Kiesel, Joseph Anthony; and Honig, Murray H., to Service Poly-Pak, Inc. Garment-containing bags. 3,865,235, Cl. 206-286.000.

Lewis Corporation: *See—*
Krenicki, Joseph; and Hunicke, Raymond L., 3,866,068.

Lewis, David W. Thickness gauge system. 3,866,115, Cl. 324-34.0TK.

Lewis, Geoffrey Arthur, to Lucas Aerospace Limited. Pressure control arrangements for air compressors. 3,865,127, Cl. 137-115.000.

Lewis, Jack, to Imperial Chemical Industries Limited. Production of unsaturated esters. 3,865,868, Cl. 260-475.00N.

Lewis, Morton, to Swift & Company. In situ soil fumigation for combating nematodes using aminomethylphosphates. 3,865,936, Cl. 424-211.000.

Li, Chou H. Method and apparatus for storage, transport, and use of cryogenic gases in solid form. 3,864,927, Cl. 62-47.000.

Liba Maschinenfabrik GmbH: *See—*
Wunner, Roland, 3,864,943.

Lieb, Philip C.; and Kesselman, David A., to Rally Enterprises, Inc. Bicycle rack. 3,865,245, Cl. 211-5.000.

Lieb, Philip C.; and Kesselman, David A., to Rally Enterprises, Inc. Bicycle racks. 3,865,246, Cl. 211-5.000.

Liebert, Karl-Heinz; and Tischer, Werner, to Zahnradfabrik Friedrichshafen AG. Steering system with hydraulic power assistance. 3,865,211, Cl. 180-79.20R.

Light, Truman S.; and Fletcher, Kenneth S., III, to Foxboro Company, The. Apparatus for measuring ionic concentration. 3,865,708, Cl. 204-195.00M.

Lindemann, Martin K., to Chas. S. Tanner Co. Nonwoven fabrics bonded with thermosetting vinyl ester emulsion copolymers. 3,865,620, Cl. 117-140.00A.

Lindemann Maschinenfabrik GmbH: *See—*
Stodt, Eberhard, 3,865,259.

Lindsey, Reed S., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; and Lindsey, Reed S., Jr., 3,866,128.

Lindsey, Sarah E.: *See—*
Falender, James R.; Lindsey, Sarah E.; and Saam, John C., 3,865,897.

Lindstadt, Hans-Jurgen: *See—*
Neier, Wilhelm; Lindstadt, Hans-Jurgen; and Webers, Werner, 3,865,606.

Lindy, Lowell B.: *See—*
Tveter, Elmer C., deceased; Harris, Guy H.; and Lindy, Lowell B., 3,865,718.

Linhart, Helmut: *See—*
Mueller, Helmut; Mosher, Paul; and Linhart, Helmut, 3,865,786.

Links, Heinz. Means for hydraulically controlling the operation of intake and exhaust valves of internal combustion engines. 3,865,088, Cl. 123-90.120.

Linn, Carl B.; and Baiocchi, Fred, to C. J. Patterson Company. Process for catalytically converting fatty acids. 3,865,855, Cl. 260-413.000.

Lisle, Thomas K., Jr.; and Romanchak, Joseph, to United States of America, Navy. Amplitude modulator having a transistor controlled bias current. 3,866,148, Cl. 332-31.00T.

Listhuber, Friedrich; Fastner, Thorwald; Bachner, Ernst; and Hoyer, Otto, to Vereinigte Osterreichische Eisen-und Aktiengesellschaft. Process for separating non-metallic inclusions from hot liquid metal. 3,865,175, Cl. 164-82.000.

Litchford, George B., to United States of America, Air Force. Angle data processor for reciprocating narrow scanning beams. 3,866,163, Cl. 340-24.000.

Litton Systems, Inc.: *See—*
Allen, Herbert J., Jr.; Todd, Ronald Earl; and Wegman, Jerry Wayne, Sr. (said Allen and Todd assors. to), 3,865,623.
Koenig, William E.; and Cunningham, James T., 3,865,232.
Wilson, Albert, 3,865,720.

Ljungstromer, Lars-Einar: *See—*
Ahacic, Kozma; and Ljungstromer, Lars-Einar, 3,865,177.

LKB-Produkter AB: *See—*
Davies, Hilary E. W., 3,865,712.

Lochrie, Leonard Marshall, to BTR Industries Limited. Hydraulic oscillator for digging bucket teeth. 3,864,852, Cl. 37-141.00R.

Lock, David P.: *See—*
Palenchar, Daniel P.; Lehker, Wayne H.; and Lock, David P., 3,866,100.

Lode, Freerk, to Lode's Instrumenten N.V. Device for exerting forces on and fixing the spinal column of a human body. 3,865,105, Cl. 128-69.000.

Lode's Instrumenten N.V.: *See—*
Lode, Freerk, 3,865,105.

Loeffler, Romain Eugene, to Johns-Manville Corporation. Purging system and method for a process producing glass fiber blankets. 3,865,540, Cl. 432-2.000.

Lofquist, Robert Allen: *See—*
DeCaprio, Joseph Donald; Haylock, John Christopher; and Lofquist, Robert Allen, 3,865,900.

Logan, Ralph Andre; Schwartz, Bertram; Tracy, Joseph Charles, Jr.; and Wiegmann, William, to Bell Telephone Laboratories, Incorporated. Dielectric optical waveguides and technique for fabricating same. 3,865,646, Cl. 148-171.000.

Logan, Walter: *See—*
Jaeger, Raymond Edward; and Logan, Walter, 3,865,564.

Lohbeck, Kurt: *See—*
Garkisch, Otto Ludwig; Ibing, Gunther; Kammholz, Gunther; Schirrmacher, Hermann; and Lohbeck, Kurt, 3,865,849.

Lohr, Delmar F., Jr.; and Kay, Edward L., to Firestone Tire & Rubber Company, The. N-(dihydrocarbylphosphoroditho)imides as premature vulcanization inhibitors. 3,865,781, Cl. 260-45.80N.

Lokerson, Donald C.; and Boston, Ronald E., to United States of America, National Aeronautics and Space Administration. X-y alphanumeric character generator for oscilloscopes. 3,866,210, Cl. 340-324.0AD.

Lolli, Lawrence V.: *See—*
Bogart, George E.; Gallagher, Robert T.; and Lolli, Lawrence V., 3,865,676.

Lombard, Claude; and Dera, Alain, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Electromagnetically operated ball-type injectors. 3,865,312, Cl. 239-585.000.

Long, David K., to Fairchild Camera and Instrument Corporation. Rectifying circuit. 3,866,063, Cl. 307-230.000.

Long, Raymond H.; and Bauer, William V., to Lummus Company, The. Process for the production of low-sulfur prereduced iron pellets. 3,865,574, Cl. 75-4.000.

Longo, Tito: *See—*
Marchisio, Maria Antonietta; Ferruti, Paolo; Longo, Tito; and Danusso, Ferdinando, 3,865,723.

Loniello, Peter J.: *See—*
Keren, William M.; and Loniello, Peter J., 3,866,017.

Lonnemo, Kurt R., to Sperry Rand Corporation. Power transmission. 3,865,514, Cl. 417-212.000.

Lonza Ltd.: *See—*
Hengartner, Kurt, 3,866,089.

Lopez, Juan M., to Leviton Manufacturing Co., Inc. Safety adapter for three-wire grounding plug. 3,865,453, Cl. 339-14.00R.

Loral Corporation: *See—*
Blinder, Marvin, 3,865,454.

Lorenz, Michael, to Sulzer Brothers Limited. Powered mobile liquefied gas carriers. 3,864,918, Cl. 60-651.000.

Lorenzi, Donald E.: *See—*
Strauts, Eric J.; Flaherty, John J.; and Lorenzi, Donald E., 3,866,116.

Loshbough, Richard C., to Reliance Electric Company. Display verifier. 3,866,171, Cl. 340-146.10C.

Louis Ethan Ltd.: *See—*
Johl, Anton; and Malich, Winfried P. H., 3,865,051.

Lovdahl, Richard H., to General Motors Corporation. Limited slip differential having shaft locking and clutch actuating means. 3,864,992, Cl. 74-711.000.

Lovejoy, Curtis N.: *See—*
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,865,698.

Lovitz, David D.; Eastman, Ness; and Davidson, William H., to Hartz Mountain Corporation, The. Small animal playground. 3,865,082, Cl. 119-17.000.

Lozano, Luis J.: *See—*
Laigle, Roger E.; and Lozano, Luis J., 3,865,012.

Lubrizol Corporation, The: *See—*
Gergel, William C., 3,865,813.

Lucas Aerospace Limited: *See—*
Lewis, Geoffrey Arthur, 3,865,127.

Lucas, Joshua Michael Stuart: *See—*
Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, 3,865,948.

Luch, Daniel, to International Nickel Company, Inc., The. Electrodeposition on non-conductive surfaces. 3,865,699, Cl. 204-20.000.

Ludwig, Jerome H.; and Dieckmann, Dale J., to Dart Industries Inc. Resin stabilizer systems of organotin sulfur-containing compounds and alkali metal bisulfite addition products. 3,865,787, Cl. 260-45.75S.

Ludwig, Jerome H.: *See—*
Phillips, Michael R.; and Ludwig, Jerome H., 3,864,939.

Ludwig, Melvin, to Eagle Electric Mgf. Co. Inc. Heavy duty electrical connector and strain relief therefor. 3,865,461, Cl. 339-103.00R.

Luffy, Dennis J.; and Mosemiller, Robert L., to Miller Printing Machinery Co. Sheet transfer cylinder. 3,865,362, Cl. 271-82.000.

Lumenition Limited: *See—*
Ford, Eric Harold, 3,866,120.

Lummus Company, The: *See—*
Long, Raymond H.; and Bauer, William V., 3,865,574.
Schindler, Harvey D.; Sze, Morgan C.; and Riegel, Herbert, 3,865,886.

Lundstrom, Norman H., to Thiokol Chemical Corporation. Non-toxic, non-corrosive, odorless gas generating composition. 3,865,660, Cl. 149-35.000.

Luscher, Thomas: *See—*
Datta, Ranajit K.; and Luscher, Thomas, 3,866,083.

Lushnikov, Leonid Georgievich: *See—*
Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna, 3,864,996.

Lussi, Heinz; Berther, Clau; and Studinka, Josef, to Inventa AG fur Forschung und Patentverwertung. Process for preparing n-substituted lactams. 3,865,814, Cl. 260-239.30R.

Lutz, Bruce C.: *See—*
Sather, Delaine C.; and Lutz, Bruce C., 3,866,213.

Lysak, David A.: *See—*
Friedman, Herman H.; Lysak, David A.; and Hornyak, John, 3,865,955.

Lytle, Dan R., to Data Products Corporation. Timing signal generating means for a high speed printer. 3,865,029, Cl. 101-93.00C.

MacDonald, John Marshall, to Pye Limited. Thermal conductivity detector apparatus. 3,864,959, Cl. 73-27.00R.

Machine Tool Divisional Services Limited: *See—*
Hodgson, Brian, 3,865,010.

MacLean-Fogg Lock Nut Company: *See—*
Hlinsky, Emil J.; and Anderson, Marvin E., 3,865,047.

MacMartin, Malcolm P.: *See—*
Kusters, Norbert L.; and MacMartin, Malcolm P., 3,866,093.

Madden, Stanley Gordon: *See—*
Brunger, William Ernest; Madden, Stanley Gordon; and Sawyer, Benjamin Robinson, 3,864,862.

Maddox, Larry A.: *See—*
Rase, Howard F.; and Maddox, Larry A., 3,865,750.

Madsen, Kristian Dahl, to Allmanna Svenska Elektriska Aktiebolaget. Turbo-generator of the radial slot type. 3,866,070, Cl. 310-214.000.

Maezawa, Keizo; and Ohta, Susumu, to Yokagawa Electric Works, Ltd. Servoamplifier device. 3,866,103, Cl. 318-678.000.

Maffii, Giulio: *See—*
Cavalleri, Bruno; Bellasio, Elvio; Testa, Emilio; and Maffii, Giulio, 3,865,847.

Magnaflux Corporation: *See—*
Strauts, Eric J.; Flaherty, John J.; and Lorenzi, Donald E., 3,866,116.

Magnesium Elektron Limited: *See—*
Pitts, Frank; and Clubley, Michael Hilton, 3,865,760.

Magnum Automotive, Inc.: *See—*
Brosene, William G., Jr., 3,865,171.

Mahaffy & Harder Engineering Company: *See—*
Molvar, Perry W., 3,864,892.

Maistrelli, Roger A.; Pruvot, Francois C.; and Poletti, Henri, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Hydrostatic transmissions for motor vehicles. 3,864,916, Cl. 60-485.000.

Majerus, Gary T. Foldable bicycle and kit for making same. 3,865,403, Cl. 280-287.000.

Maki, Isao, to Soko Co., Ltd. Synthetic fibrous unit which is three-dimensionaliy crimped and twisted. 3,864,903, Cl. 57-140.00J.

Makino, Katsuo: *See—*
Jo, Seiji; and Makino, Katsuo, 3,865,612.

Malich, Winfried P. H.: *See—*
Johl, Anton; and Malich, Winfried P. H., 3,865,051.

Mallahan, Francis J.: *See—*
Wenckus, Joseph F.; Castonguay, Roger A.; Hanfly, Bernard C.; and Mallahan, Francis J., 3,865,554.

Malone, Laurence A. Porcelain-like composition. 3,865,774, Cl. 260-29.60S.

Mamo, Anthony C.: *See—*
Paulson, Donald L.; and Mamo, Anthony C., 3,865,104.

Mamontov, Vladimir Romanovich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Manly, Donald G., to Air Products and Chemicals, Inc. Non-thrombogenic plastics. 3,865,615, Cl. 117-47.00A.
Mann, August C.; and Dillman, Thayer L., to Westinghouse Electric Corporation. Blown fuse indicator for rotating equipment. 3,866,196, Cl. 340-250.000.
Manning Environmental Corporation: *See—*
Schontzler, James G.; Gates, Wendall C.; and DaGragnano, Victor L., 3,866,028.
Manor, Jehuda, to Israel Aircraft Industries, Ltd. Aircraft take off indicator systems. 3,865,071, Cl. 116-129.00R.
Mansmann, Manfred; and Schmidt, Ludwig, to Bayer Aktiengesellschaft. Aluminum oxide fibers and their production. 3,865,599, Cl. 106-65.000.
Mantel, Edward R.: *See—*
Ballantyne, David B.; Mantel, Edward R.; and Robinson, George H., 3,865,638.
Marathan Manufacturing Company: *See—*
Bogart, George E.; Gallagher, Robert T.; and Lolli, Lawrence V., 3,865,676.
Marchisio, Maria Antonietta; Ferruti, Paolo; Longo, Tito; and Danusso, Ferdinando, to Zambon S.p.A. Method to form stable complexes of polyanions occurring in biological liquids. 3,865,723, Cl. 210-54.000.
Marecek, Helmut: *See—*
Stich, Heinrich; Binder, Walter; Hutter, Josef; and Marecek, Helmut, 3,865,602.
Mariner, Charlie D.: *See—*
Shlesinger, Bernard Edward, Jr.; and Mariner, Charlie D., 3,866,007.
Marion, George J. Method of producing multi-layer flat film. 3,865,665, Cl. 156-244.000.
Mark Products, Inc.: *See—*
Florian, Eugene F., 3,866,162.
Markovchik, Carl Joseph: *See—*
Charles, John Frederick; and Markovchik, Carl Joseph, 3,864,999.
Marmorek, H. Stephen, to Sprague Electric Company. Plastic encased component with reflowed-plastic sealed leads. 3,866,095, Cl. 317-230.000.
Maronde, Herbert; and Holzapfel, Jurgen, to Robot Foto Und Electronic GmbH & Co. KG. Device for monitoring traffic. 3,866,165, Cl. 340-31.00C.
Marosi, Laslo: *See—*
Broecker, Franz Josef; Kaempfer, Knut; Marosi, Laslo; Schwarzmann, Matthias; and Triebskorn, Bruno, 3,865,753.
Marshall, David James: *See—*
Ross, John Edward; Marshall, David James; and Chapman, Brian Samuel, 3,865,613.
Marshall, Edward T.: *See—*
Rowe, Arthur W.; and Marshall, Edward T., 3,865,411.
Marston, Judith, to Blood Services. Test tube. 3,865,552, Cl. 23-259.000.
Martin, George Christopher James: *See—*
Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, 3,865,948.
Martinozzi, Giulio, to Kinespherics, Inc. Kinematic mechanism for the reversible conversion of reciprocating motion to rotary motion. 3,864,982, Cl. 74-60.000.
Marubayashi, Gen: *See—*
Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, 3,865,971.
Marvin Glass & Associates: *See—*
Breslow, Jeffrey D.; and Jaworski, Eugene, 3,864,870.
Breslow, Jeffrey D.; and Glass, Marvin I., 3,865,367.
Breslow, Jeffrey D., 3,865,379.
Glass, Marvin I.; and Breslow, Jeffrey D., 3,865,376.
Kaelin, Bette M., 3,864,871.
Marx, Karl; and Sandbrand-Nisipeanu, Zacharias. Method and apparatus for lining the walls of excavations. 3,864,921, Cl. 61-41.00A.
Maryland Cup Corporation: *See—*
Spies, Harvey A., 3,865,272.
West, John Barth, 3,864,898.
Marzocchi, Alfred; and McAuslan, Robert R., to Owens-Corning Fiberglas Corporation. Reinforcement of elastomeric products. 3,865,677, Cl. 161-55.000.
Marzocchi, Alfred, to Owens-Corning Fiberglas Corporation. Glass fiber reinforced elastomers. 3,865,682, Cl. 161-170.000.
Masat, Jan; Dohnalek, Rudolf; and Chvejka, Jiri, to Spolana, narodni podnik. Apparatus for continuously preparing perchlormethyl mercaptan. 3,865,553, Cl. 23-260.000.
Maschinenfabrik Zuckermann Komm. Ges.: *See—*
Schmidt, Erich, 3,865,162.
Maserjian, Joseph: *See—*
United States of America, National Aeronautics and Space Administration; and Maserjian, Joseph, 3,865,975.
Massachusetts Institute of Technology: *See—*
Bannister, Lawrence H.; and Baker, Richard H., 3,866,060.
Massier, Pierre, to La Societe Civile Agricole de Mycelium du Centre Ouest (S.C.A.M.Y.C.O.). Culture of mycelium. 3,865,695, Cl. 195-81.000.
Massoney, Dwight F., to Textron Inc. Push type threaded fastener and method of using same. 3,865,006, Cl. 85-44.000.
Mastaj, Joseph A., to Worthington-CEI, Incorporated. Auxiliary tool control circuit. 3,865,013, Cl. 91-411.00R.
Masters, George Ernest; Bache, John Kenneth; and Absalom, Ralph Rowland, to said Adsalom, by said Masters and Bache. Control systems especially for diesel engine installations. 3,865,090, Cl. 123-139.0AZ.
Masterson, Daniel M.: *See—*
McKay, Alexander R.; and Masterson, Daniel M., 3,865,145.
Mastronardi, Pasquale Patrick John, to Estey Corporation. Storage means with shiftable units. 3,865,446, Cl. 312-201.000.
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Still picture broadcasting receiver. 3,865,973, Cl. 178-5.80R.
Mataya, John A.: *See—*
Lapham, Jerome F., Jr.; and Mataya, John A., 3,864,817.
Mathers, Robert Valentine; and Unsworth, Derek, to Rubery Owen-Rockwell, Limited. Manufacturing of shoes for vehicle brakes. 3,864,800, Cl. 29-149.50R.
Mathers, Robert Valentine; and Thompson, Frederick, to Rubery Owen-Rockwell, Limited. Suspension units for multiple-axle vehicles. 3,865,395, Cl. 280-104.50B.
Matras, Edward J.: *See—*
Broling, Fred W.; Baker, Jeffrey A.; and Matras, Edward J., 3,865,727.
Matsuda, Yoshio, to Yoshida Kogyo Kabushiki Kaisha. Warp-knitted fastener tapes. 3,864,946, Cl. 66-193.000.
Matsufuji, Akira; and Numajiri, Kenji. Apparatus for forming spiral steel pipe. 3,864,952, Cl. 72-135.000.
Matsumoto, Tadashi; and Yoshida, Takashi, to Nippon Steel Corporation. Flux-cored electrode wire for non-sheilded arc welding. 3,866,015, Cl. 219-146.000.
Matsuo, Hiroyuki: *See—*
Yokoyama, Kanji; and Matsuo, Hiroyuki, 3,866,112.
Matsushita Electric Industrial Co., Ltd.: *See—*
Asai, Komei; Fukai, Masakazu; and Moriyama, Akio, 3,865,469.
Hiraki, Hisao; and Miyagawa, Katsuhiko, 3,865,977.
Ishii, Akira; Kondo, Kaneichi; and Uchibori, Kenichi, 3,866,069.
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Kawamata, Yukio; Yamamoto, Keisuke; and Mouri, Hiroshi, 3,866,177.
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Matthews, Donnell R., Jr.: *See—*
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Matthewson, Randall W.: *See—*
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Matthias, Guenther: *See—*
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Matusdo, Kazuo; Shimomura, Takayoshi; and Oosawa, Kooichi, to Nippon Kokan Kabushiki Kaisha. Process of making cold reduced steel. 3,865,637, Cl. 148-12.100.
Matveev, Mikhail Semenovich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.
Maxwell, Thomas J.: *See—*
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May & Baker Limited: *See—*
Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, 3,865,948.
Mayfield, Albert H., to General Motors Corporation. Catalytic converter filling apparatus. 3,865,159, Cl. 141-67.000.
Maynard, Robert W.; and Alexander, Kenneth W., to Mosler Safe Company, The. Depository for imprinting and storing envelopes containing paper currency and/or coins. 3,866,235, Cl. 346-22.000.
Mayne, W. Harry: *See—*
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Maytham, Walter J.: *See—*
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Mayuzumi, Tetsuya: *See—*
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McAuslan, Robert R.: *See—*
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McBeth, Clyde Warren, to Shell Oil Company. Nematicides. 3,865,938, Cl. 424-219.000.
McCaslin, Sadler C.; and Smith, Wilbur J. Garbage enclosure. 3,865,449, Cl. 312-352.000.
McClintic, Wayne L.: *See—*
Sheetz, Charles E.; and McClintic, Wayne L., 3,864,894.
McColl, Bruce John, to Owens-Illinois, Inc. Split phase head reach system for tree harvester. 3,865,160, Cl. 144-3.00D.

McCormack, Leonard J.; and DeGrange, Wallace L., Jr., to Reimers Electric Steam, Inc. Seambuster. 3,865,285, Cl. 223-73.000.
McCormick, Thomas W., to Mining Equipment Division, a division of FMC Corporation. Protective canopy for a portable drilling machine. 3,865,197, Cl. 173-23.000.
McCoy, Frederic C.; and Cole, Edward L., to Texaco Inc. Alkylation catalyst additive. 3,865,896, Cl. 260-683.510.
McCoy, Raymond D.: *See—*
Ayers, Buell O.; and McCoy, Raymond D., 3,865,562.
McCreery, James F.; and Jones, Dennis G., to Kennametal Inc. Tool holder. 3,864,799, Cl. 29-96.000.
McCrobie, George L.; and Donnel, Roscoe J., to Xerox Corporation. Variable magnification lens system. 3,865,470, Cl. 350-184.000.
McCrobie, George L., to Xerox Corporation. Lens system for photoelectrophoretic copying machine. 3,865,471, Cl. 350-215.000.
McCulloch Corporation: *See—*
Anderson, Harold E., 3,864,965.
McDermott, John W., to Beaird-Poulan, Inc. Chain saw oiling system. 3,865,213, Cl. 123-196.0CP.
McDonald, Hugh C. Surveillance aircraft muffler. 3,865,212, Cl. 181-43.000.
McDonnell Douglas Corporation: *See—*
Grossman, Jack J., 3,865,490.
Sheratte, Martin B., 3,865,743.
McGee, Arthur L.: *See—*
Begun, Robert A.; Thuse, Erik; and McGee, Arthur L., 3,865,142.
McGee, John K.; and Kolell, Norbert C., to Gidding & Lewis Inc. Numerical control with envelope offset and automatic path segment transitions. 3,866,179, Cl. 340-172.500.
McGehee, C. Bernie; Rees, J. Samuel; and Johnson, Luther J., Jr. Tire conditioning and truing apparatus. 3,865,527, Cl. 425-11.000.
McGehee, Wallace L. Rotary dehydrator-granulator. 3,864,841, Cl. 34-11.000.
McGraw-Edison Company: *See—*
Forg, John H.; and Payet, George L., 3,865,545.
McGuirk, Francis A., Jr., to Wager Electric Corporation. Door lock, power and alarm control circuit for automotive vehicles and the like. 3,866,168, Cl. 340-64.000.
McIngvale, Pat H., to United States of America, Army. Waveform control circuit using gain-controlled amplifier stage. 3,866,065, Cl. 307-260.000.
McKay, Alexander R.; and Masterson, Daniel M., to Foundation Cryogenic Joint Venture. Pipeline system. 3,865,145, Cl. 138-113.000.
McKenney, John D.; and Rumsey, Thomas R., to Royal Industrial Inc. Moisture separating tank. 3,865,180, Cl. 165-1.000.
McManus, Richard J., to Hi-Tor Inventions, Corporation. Emergency data band. 3,864,856, Cl. 40-21.00C.
McMarlin, Robert M., to Pittsburgh Corning Corporation. Method and apparatus for closing a passageway. 3,864,883, Cl. 52-221.000.
McMillin Investments, Inc.: *See—*
Woodbridge, David D., 3,865,734.
McMullen, Charles H., to Union Carbide Corporation. Preparation of ketones. 3,865,881, Cl. 260-593.00R.
McNamara, Thomas P.: *See—*
Quelly, Joseph R.; and McNamara, Thomas P., 3,865,880.
McNeil Laboratories, Inc.: *See—*
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Schwartz, Norman; and Mohrbacher, Richard J., 3,865,826.
McPhail, Hazel M.: *See—*
McPhail, William B.; and McPhail, Hazel M., 3,865,378.
McPhail, William B.; and McPhail, Hazel M. Bowl for table type game. 3,865,378, Cl. 273-128.00A.
McWilliams, Orcenith D.; and Rice, Roger A., to Caterpillar Tractor Company. Hydraulic control valve for fluid suspension system. 3,865,135, Cl. 137-596.140.
Mechin, Gerard H., to Societe Anonyme Poclain. Device for supplying fluid under pressure to two reversible load elements. 3,864,910, Cl. 60-420.000.
Mefferd, Wayne S.: *See—*
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Hobart, James Lee; and Mefferd, Wayne S., 3,866,140.
Meguro, Kanji; and Kuwada, Yutaka, to Takeda Chemical Industries, Ltd. 1,4-Benzodiazepine derivatives. 3,865,811, Cl. 260-239.0BD.
Mehta, Brahm Dev: *See—*
Hearsey, Colin John; and Mehta, Brahm Dev, 3,865,875.
Meier, Johann Hans, to International Business Machines Corporation. Digital phase control for ink jet printer. 3,866,237, Cl. 346-75.000.
Meinhardt, Gunter: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Frenken, Hans; Friedsam, Josef; and Meinhardt, Gunter, 3,864,843.
Mellenthin, William J.: *See—*
Feldman, Stanley; and Mellenthin, William J., 3,865,982.
Melnick, Dennis M.; and Kubick, Mark, to Pallet Development Inc. Freezer spacer. 3,865,024, Cl. 99-645.000.
Melnick, Dennis M.; and Kubick, Mark, to Pallet Development Inc. Sled. 3,865,391, Cl. 280-18.000.
Memorex Corporation: *See—*
Sischka, Frederic J., 3,865,741.
Menet, Albert: *See—*
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Mengler, Helmut, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. 3-(3',4'-Dichloro-6'-alkyl-phenyl)-delta, 2-pyrazoline derivatives. 3,865,816, Cl. 260-239.900.
Merck & Co., Inc.: *See—*
Baldwin, John J.; and Novello, Frederick C., 3,865,945.
Meredith, Joel B.: *See—*
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., 3,864,911.
Merger, Franz, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. 2-Hydroxy-3,3-dimethyl-4-oxotetrahydrofuran production. 3,865,850, Cl. 260-347.800.
Merges, John C., Jr.: *See—*
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Meriaudeau, Paul: *See—*
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Merrill, Duane F., to General Electric Company. Process for bodying organopolysiloxanes. 3,865,766, Cl. 260-18.00S.
Merz, Herbert; Langbein, Adolf; Wick, Helmut; and Stockhaus, Klaus, to Boehringer Ingelheim G.m.b.H. Pharmaceutical compositions containing an n-(furyl-methyl)-3-oxy-morphinan and method of use. 3,865,943, Cl. 424-260.000.
Merzweiler, Leo A., to Summit Plastic Corporation. Tire display apparatus. 3,864,860, Cl. 40-125.00M.
Meserole, Robert H., to Johns-Manville Corporation. Helically wound tubing and method of forming the same. 3,865,146, Cl. 138-154.000.
Messner, Alan: *See—*
United States of America, National Aeronautics and Space Administration; Perlman, Marvin; Rousey, William J.; and Messner, Alan, 3,866,022.
Metailler, Roger, to Societe Anonyme Richier. Hydraulic system for displacing a load with automatic hydrostatic balancing. 3,864,915, Cl. 60-468.000.
Metallgesellschaft AG: *See—*
Garkisch, Otto Ludwig; Ibing, Gunther; Kammholz, Gunther; Schirrmacher, Hermann; and Lohbeck, Kurt, 3,865,849.
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Gottschol, Hans Joachim; and Gottschol, Karl Josef, 3,865,577.
Metcalfe, Kenneth A.; and Clements, Alwin S., to Commonwealth of Australia Care of the Secretary Department of Supply, The. Charging photoconductive membranes. 3,866,096, Cl. 317-262.00A.
Metrologic Instruments, Inc.: *See—*
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Mettler Instrumente AG: *See—*
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Metzinger, Lothar; Gottschalk, Alfred; Schoettle, Klaus; and Schwaab, Josef. Process for the removal of volatiles from polymer solutions. 3,865,672, Cl. 159-47.00R.
Meyer, Leonard S.: *See—*
Drostholm, Frede Hilmar; and Meyer, Leonard S., 3,865,526.
Meyer, Martin R.: *See—*
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Michigan Chemical Corporation: *See—*
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Michniewicz, Joseph J.: *See—*
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Micro Bio-Medics Inc.: *See—*
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Micro-Gen Equipment Corporation: *See—*
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Micromedic Systems, Inc.: *See—*
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Microsystems International Limited: *See—*
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Midthun, Robert A.: *See—*
Johnson, B. Neil; and Midthun, Robert A., 3,865,536.
Milam, David; Hordvik, Audun; Bradbury, Rudolph A.; and Schlossberg, Howard R., to United States of America, Air Force. Bandwidth-limited, cavity-dumped, laser system. 3,866,141, Cl. 331-94.50M.
Milchem Incorporated: *See—*
Bruson, Herman A.; and Gould, Henry, 3,865,793.
Miles, William B.; and Copeland, John S., to Addressograph-Multigraph Corporation. Area measuring device. 3,865,486, Cl. 355-64.000.
Miller, Harry B., to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft. Pneumatic control system for use in automatic yarn transfer system. 3,865,321, Cl. 242-18.00A.
Miller Printing Machinery Co.: *See—*
Luffy, Dennis J.; and Mosemiller, Robert L., 3,865,362.
Millonzi, Richard P.: *See—*
Radler, Richard W., Jr.; Millonzi, Richard P.; and Bergfjord, John A., 3,865,798.
Mills, King L., to Phillips Petroleum Company. Production of carbon black of reduced grit content. 3,865,925, Cl. 423-450.000.
Mills, Terence L., to Molex Inc. Electrical terminal. 3,865,459, Cl. 339-95.00R.
Mimco Incorporated: *See—*
Pase, Hugh H., 3,865,347.
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Mining Equipment Division, a division of FMC Corporation: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
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Faust, Michael C.; and Seabold, Thomas W., 3,865,224.
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Harrington, Joseph Kenneth; and Trepka, Robert D., 3,865,844.
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Nelson, Charles Edward; and Jewett, Clifford L., 3,865,352.
Roden, John S.; Kirkevold, Kent A.; Tritle, Gary L.; and Sjerven, Gene A., 3,865,627.

Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert T.; and Semon, Warren L., to Monsanto Company. Non-conservative bubble logic circuits. 3,866,191, Cl. 340-174.0TF.

Minniear, Max E.; and Herrin, Carlos B., to Monarch Marking Systems, Inc. Scanning apparatus. 3,866,056, Cl. 250-566.000.

Minolta Camera Co., Ltd.: *See—*
Tsujiimoto, Kayoshi, 3,866,240.

Mintz, Charlotte: *See—*
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Misawa, Seisuke: *See—*
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Mischenko, Alexandr Petrovich: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 3,865,891.

Mita Industrial Co. Ltd.: *See—*
Washio, Takaji; and Aizawa, Tatsuo, 3,865,481.

Mitchell, Reid L.; Muller, Thomas E.; Stevens, Hugh D.; and Tabke, Robert S., to International Telephone and Telegraph Corporation. Wet spinning cellulosic products. 3,865,918, Cl. 264-188.000.

Mitchell, Richard E., to Sun Ventures Inc.; and Teijin Limited. Process for alkenylation of alkylbenzenes. 3,865,889, Cl. 260-668.00B.

Mitchell S.A.: *See—*
Pradillon, Michel, 3,865,390.

Mitchell, Stanley W.; and Spenchuk, Edward N. Trailer dolly. 3,865,405, Cl. 280-476.00R.

Mitchell, William E., to Dunlop Limited. Wheels and pneumatic tire and wheel assemblies. 3,865,170, Cl. 152-386.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Anzai, Nobuo; and Terazono, Narihiro, 3,866,097.
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Miyoshi, Keisuke; and Shibano, Naoki, to Matsushita Electric Industrial Co., Ltd. Flyback transformer apparatus. 3,866,086, Cl. 315-411.000.

Mizuki, Eiichi: *See—*
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Mizusawa, Shim-Ichiro; and Hishiki, Tsutomu, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Sango Co., Ltd. Pipe joint. 3,865,413, Cl. 285-367.000.

Mizutani, Seiki: *See—*
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Moberly, Charles W., to Phillips Petroleum Company. Arylene sulfide polymers. 3,865,795, Cl. 260-79.100.

Mobil Oil Corporation: *See—*
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Mobius, Hans Eberhard; Kubini, Jakob; and Soraya, Sorayapour. Method for thermal treatment of rings consisting of wire or strip material. 3,865,640, Cl. 148-12.900.

Moebs, Heinz: *See—*
Roth, Mario; Siemonsen, Hans Peter; Kuiff, Siegfried; and Moebs, Heinz, 3,865,558.

Mohr, John Gilbert, to Johns-Manville Corporation. Aqueous fiber glass sizing composition. 3,865,768, Cl. 260-23.0AR.

Mohrbacher, Richard J.: *See—*
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Mohri, Katsuo: *See—*
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Mojonnier, Albert B.; and Lenke, Paul W., to Albert Majonnier, Inc. Bag construction. 3,865,304, Cl. 229-65.000.

Molex Inc.: *See—*
Mills, Terence L., 3,865,459.

Molins, Desmond Walter; Labbe, Francis Auguste Maurice; and Perkins, Clive, to Molins Limited. Cigarette filters. 3,865,121, Cl. 131-261.00B.

Molins Limited: *See—*
DeTorre, Robert P., 3,865,673.
Molins, Desmond Walter; Labbe, Francis Auguste Maurice; and Perkins, Clive, 3,865,121.

Molvar, Perry W., to Mahaffy & Harder Engineering Company. Automatic packaging method and apparatus with heat-sealing elements having resilient heat conducting members. 3,864,892, Cl. 53-39.000.

Monarch Marking System Company: *See—*
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Monarch Marking Systems, Inc.: *See—*
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Monroe, Elmer S., Jr., to du Pont de Nemours, E. I., and Company. Cyclonic incinerator. 3,865,054, Cl. 110-8.00C.

Monroe, Marvin E., to North Electric Company. Laser diode for use with film memory system. 3,866,238, Cl. 346-76.00L.

Monsanto Company: *See—*
Lannert, Kent P., 3,865,755.
Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert T.; and Semon, Warren L., 3,866,191.
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Moody, Roy A.; and Roberson, Raymond F., to Panduit Corp. Powered strap tensioning and severing tool. 3,865,156, Cl. 140-123.600.

Moog Inc.: *See—*
Roess, Louis G., 3,865,528.

Moore, Benjamin F., III, to Raymond Lee Organization Inc., The. Graduated stick and tethered ball. 3,865,372, Cl. 273-95.00A.

Moore, Charles R.: *See—*
Dreitzler, David R.; Moore, Charles R.; and Thorn, Lawrence B., 3,864,958.

Moore, Lawrence A.; and Welty, Donald R., to Beloit Corporation. Blow molds for making containers having recessed bottoms. 3,865,531, Cl. 425-387.00B.

Moore, Robert A., to Westinghouse Electric Corporation. Broadband unidirectional surface wave transducer. 3,866,154, Cl. 333-30.00R.

Moorman, Charles J.; Reuter, Frederick A.; Yorke, Daniel F.; and Meyer, Martin R., to Mosler Safe Company, The. Access control system for restricted area. 3,866,173, Cl. 340-149.00A.

Morgan Construction Company: *See—*
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Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna. Die for cutting pipes. 3,864,996, Cl. 83-5.000.

Mori, Kazuo: *See—*
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Mori, Keijiro; Indo, Masahiro; and Yamamoto, Taro, to Matsushita Electric Industrial Co., Ltd. Central temperature controlling apparatus having separate pressure and temperature control means. 3,865,181, Cl. 165-22.000.

Mori, Takao: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Sato, Tadashi; and Mori, Takao, 3,865,726.

Mori, Takemitsu, to Nippon Concrete Industries Co. Ltd. Device for clamping a mold frame used for centrifugal compaction of concrete. 3,865,534, Cl. 425-450.00C.

Morimoto, Takeshi: *See—*
Oda, Yoshio; Uchida, Keiichi; and Morimoto, Takeshi, 3,865,873.

Morisaki, Nobukazu, to Daido Metal Company, Ltd. Device for measuring the interferences and the inclinations of abutting surfaces of a half plain bearing. 3,864,835, Cl. 33-174.00E.

Morita, Kazuo: *See—*
Nakamura, Shinichi; Morita, Kazuo; and Takada, Masami, 3,866,121.

Moriyama, Akio: *See—*
Asai, Komei; Fukai, Masakazu; and Moriyama, Akio, 3,865,469.

Morjan, Jean, to Etablissements J. B. Gabriels S.P.R.L. Process for conditioning the welding area of the cylindrical body of a packing can. 3,864,813, Cl. 29-475.000.

Morris, Glenn H. Child-proof and pharmacist-assisting reversible closure for containers. 3,865,267, Cl. 215-206.000.

Morris, John: *See—*
Othen, Sidney Arthur; and Morris, John, 3,864,912.

Morris, Robert C.: *See—*
Cline, Carl F.; and Morris, Robert C., 3,866,142.

Morse, Charles W.: *See—*
DePaola, John J.; and Morse, Charles W., 3,865,042.

Morton, Roger Roy Adams, to Bausch & Lomb Incorporated. Apparatus for direct electronic measurement of images. 3,865,493, Cl. 356-158.000.

Mosemiller, Robert L.: *See—*
Luffy, Dennis J.; and Mosemiller, Robert L., 3,865,362.

Moser, Edward: *See—*
Levey, Gustave S.; and Moser, Edward, 3,865,314.

Moser, Jessie Lee; Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, to AMP Incorporated. Loading coil means for multiconductor cable. 3,865,980, Cl. 178-46.000.

Moser, Robert; and Staheli, Paul, to Rieter Machine Works, Ltd. Apparatus for depositing fiber flock in a chute. 3,865,439, Cl. 302-59.000.

Mosher, Paul: *See—*
Mueller, Helmut; Mosher, Paul; and Linhart, Helmut, 3,865,786.

Mosler Safe Company, The: *See—*
Maynard, Robert W.; and Alexander, Kenneth W., 3,866,235.
Moorman, Charles J.; Reuter, Frederick A.; Yorke, Daniel F.; and Meyer, Martin R., 3,866,173.

Mosterd, Jacob Hendrik. Device for modelling poultry (part 1). 3,864,787, Cl. 17-11.000.

Mote, Neil H.: *See—*
Heldenbrand, Stanley W.; Johnson, David L.; and Mote, Neil H., 3,865,484.

Motorola, Inc.: *See—*
Augustin, Michael J.; Kramer, Wayne C.; and Treanor, Robert M., 3,866,136.
Steel, Francis R., 3,866,137.

Mott, James D., to Hydril Company. Well apparatus and method of operating same for performing well operations. 3,865,191, Cl. 166-315.000.

Mouri, Hiroshi: *See—*
Kawamata, Yukio; Yamamoto, Keisuke; and Mouri, Hiroshi, 3,866,177.

Mudge, Clifton F., to Cand A Laboratories, Inc. Analgesic composition. 3,865,933, Cl. 424-153.000.

Mueller, Helmut; Mosher, Paul; and Linhart, Helmut, to Ciba-Geigy Corporation. Manganous organo phosphonate UV light absorbers for polyamides. 3,865,786, Cl. 260-45.75R.

Mueller, Karl: *See—*
Holik, Herbert; and Mueller, Karl, 3,865,719.

Mueller, Martin: *See—*
Byrd, Carl; and Mueller, Martin, 3,865,281.

Muir, David Michael: *See—*
Parker, Alan James; Waghorne, Winfield Earle; Giles, Dion Ewing; Sharp, John Howard; Alexander, Robert; and Muir, David Michael, 3,865,744.

Muller, Friedhelm, to Holstein & Kappert Maschinenfabrik Phonix GmbH. Conveying and stacking system for articles. 3,865,258, Cl. 214-6.00H.

Muller, Jean Jacques; and Henquet, Andre Jean, to International Standard Electric Corporation. Frequency division multiplex switching system. 3,866,178, Cl. 340-171.00R.

Muller, Richard: *See—*
Wingler, Frank; Muller, Richard; and Pollheide, Dieter, 3,865,904.

Muller, Thomas E.: *See—*
Mitchell, Reid L.; Muller, Thomas E.; Stevens, Hugh D.; and Tabke, Robert S., 3,865,918.

Mullis, Jerry D., to Consolidated Brass Company. Lock valve. 3,865,130, Cl. 137-385.000.

Mulvey, Gerard Edmund. Radiator mounted raceway. 3,865,969, Cl. 174-48.000.

Munson, William O.; and Reed, Russell, Jr., to Thiokol Chemical Corporation. Multi-use munition. 3,865,035, Cl. 102-66.000.

Murakoshi, Makoto: *See—*
Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, 3,865,478.

Murao, Yoshio. Automatic bobbin loader. 3,864,893, Cl. 53-59.00R.

Murota, Shoji: *See—*
Sekino, Shozo; Sakakihara, Mizuo; and Murota, Shoji, 3,865,581.

Murray, Joseph E., Jr.: *See—*
Hardy, Herbert L.; Murray, Joseph E., Jr.; and Wray, William R., 3,865,475.

Muse, George B. Wall structures. 3,864,885, Cl. 52-259.000.

Musser, Michael T.; and Streitwieser, Andrew, Jr., to du Pont de Nemours, E. I., and Company. Selective removal of 2-pentenenitrile and 2-methyl-2-butenenitrile from 3-pentenenitrile. 3,865,865, Cl. 260-465.900.

Mustakas, Gus C., to United States of America, Agriculture. Process for obtaining full-fat oilseed-protein beverages using water and initial acid pH. 3,865,802, Cl. 260-123.500.

Musto, Richard Leopold, to Combustion Engineering, Inc. Upstream classifier for a multi-separator. 3,865,242, Cl. 209-143.000.

Myeress, Rudolph S., to Allied Steel & Tractor Products, Incorporated. Mounting assembly for a light beam generator. 3,864,837, Cl. 33-299.000.

Myller, Rolf. Method of making a three-dimensional sheet puzzle. 3,865,382, Cl. 273-157.00R.

N. L. Industries, Inc.: *See—*
Koch, James H., 3,864,815.

N.V. Industrieele Handelscombinatie Holland: *See—*
Van Heijst, Willem Jan, 3,865,064.

N.V. Technische Maatschappij Bergmann: *See—*
Condolios, Elie; and Essen, Uilke Van, 3,865,725.

Nabeyama, Hiroaki: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.

Nagai, Yukio, to Nippondenso Co., Ltd. Power boost auxiliary diode assembly for vehicle alternator. 3,866,072, Cl. 310-68.00D.

Nagata, Shuji: *See—*
Takahashi, Nobuyuki; Suemune, Kenitiro; Nagata, Shuji; and Tomozoe, Tatumi, 3,865,645.

Nagler Aircraft Corporation: *See—*
Nagler, Bruno A., 3,865,508.

Nagler, Bruno A., to Nagler Aircraft Corporation. Ramjet powered rotor blade. 3,865,508, Cl. 416-22.000.

Nahmias, Michael A.; and Bullard, Edward M., to Mobil Oil Corporation. Heat sealable isotactic polypropylene and 1,3 pentadiene polymer. 3,865,903, Cl. 260-889.000.

Nahr, Helmar. Method of making a composite body consisting of at least two component parts such as profiles. 3,865,914, Cl. 264-46.50D.

Naismith, William Dixon. Cam grinding. 3,864,879, Cl. 51-101.00R.

Nakada, Kouiti, to Kabushiki Kaisha Komatsu Seisakusho. Transfer feeder. 3,865,230, Cl. 198-218.000.

Nakagawa, Kiyoshi: *See—*
Hirayama, Tadamasa; and Nakagawa, Kiyoshi, 3,865,825.

Nakahara, Masaki: *See—*
Arai, Mamoru; Itoh, Yashuhiro; Nakahara, Masaki; Kayamori, Hisashi; and Sugawara, Shinichi, 3,865,693.

Nakai, Shinji: *See—*
Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, 3,865,866.

Nakajima, Hitoshi; and Nishimaru, Hiroji, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for producing cyanoalkadienes. 3,865,864, Cl. 260-465.300.

Nakajima, Shinyo: *See—*
Inoue, Toshiaki; Nakajima, Shinyo; Uraya, Tohru; Kanamori, Toshiaki; and Fukuda, Kazuo, 3,864,949.

Nakamura, Shinichi; Morita, Kazuo; and Takada, Masami, to Nippon Telegraph and Telephone Public Corporation; and Nippon Electric Company, Limited. Radio-frequency relay system. 3,866,121, Cl. 325-2.000.

Nakamura, Yoshio: *See—*
Katagiri, Kotaro; and Nakamura, Yoshio, 3,865,799.

Nakayama, Shozo; and Kurahashi, Masayuki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Swash plate compressor. 3,864,801, Cl. 29-156.4WL.

Nalco Chemical Company: *See—*
Jursich, Myron J.; and Randich, Gail T., 3,865,686.

Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich. Method for the refining of gasolines to high-octane fuel. 3,865,715, Cl. 208-243.000.

Naphtachimie: *See—*
Repiquet, Gerard; and Crouzet, Jean Claude, 3,865,762.

Narang, Saran A.; and Michniewicz, Joseph J., to Canadian Patents and Development Limited. Aromatic dextran derivatives. 3,865,807, Cl. 260-209.00D.

Nardi, Anthony, to Clean Energy, Inc. Rotary steam engine. 3,865,522, Cl. 418-161.000.

Nason, Stephen G.: *See—*
Roberts, James R.; and Nason, Stephen G., 3,865,315.

National Presto Industries, Inc.: *See—*
Beiswenger, John L., 3,866,201.

National Public Radio: *See—*
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National Research Development Corporation: *See—*
Baker, Francis Sidney; Harrison, Charles Richard; Osborn, Anthony Raymond; and Williams, John, 3,866,077.
Bott, Barry; Firth, Jack Graham; Jones, Alan; and Jones, Thomas Alwyn, 3,865,550.
Pike, Edward Roy, 3,866,055.

National Starch and Chemical Corporation: *See—*
Szymanski, Chester D.; and Helmstetter, Gerald J., 3,865,603.

Nawrocki, Norbert Joseph, to F. L. Jacobs Company. Safety control device with obstruction feeler and switch assembly. 3,866,004, Cl. 200-61.420.

NCR Corporation: *See—*
Seifert, Lloyd R., Jr.; and Hinrichs, Joel H., Jr., 3,866,175.

Neal, Donald C. Fish lure. 3,864,863, Cl. 43-42.150.

Neal, Frank, to John C. Motter Printing Press Co. Folder cylinder. 3,865,361, Cl. 270-76.000.

Neale, Robert Schwenn; and Pines, Arthur Noah, to Union Carbide Corporation. Stabilized organosilicon polymers. 3,865,784, Cl. 260-45.75R.

Nebiolo, Renaldo A.: *See—*
Bridigum, Robert J.; and Nebiolo, Renaldo A., 3,865,252.

Nechiporenko, Anatoly Ionovich: *See—*
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Neglia, Ettore, to P. Ferrero & C. S.p.A. Column-shaped display device for parallelepipedic articles. 3,865,247, Cl. 211-72.000.

Neier, Wilhelm; Lindstadt, Hans-Jurgen; and Webers, Werner, to Deutsche Texaco Aktiengesellschaft. Process for the continuous production of aqueous paraffin emulsions. 3,865,606, Cl. 106-271.000.

Nelson, Charles Edward; and Jewett, Clifford L., to Minnesota Mining and Manufacturing Company. Static mixing device. 3,865,352, Cl. 259-4.000.

Nelson, Donald J.: *See—*
Wen, Samuel S.; and Nelson, Donald J., 3,866,061.

Nembach, Siegfried, to Hydromatik GmbH. Fluid pressure control system for a compound transmission comprising an adjustable hydrostatic transmission part and a secondary mechanical load changeover transmission. 3,864,991, Cl. 74-687.000.

Neslon, Albert W., to Koehring Company. Self-propelled soil stabilizer machine. 3,865,195, Cl. 172-3.000.

Neubert, Rolf: *See—*
Wehling, Rolf; and Neubert, Rolf, 3,864,902.

Neumann, Norbert F.; and Crimes, Peter B., to Kennecott Copper Corporation. Molybdenum and ferromolybdenum production. 3,865,573, Cl. 75-3.000.

Neumann, Robert G., to Specialty Papers Co., The. Laminated foil candy wrapper and method of preparing. 3,865,664, Cl. 156-192.000.

New England Log Homes, Inc.: *See—*
Vizziello, Vito M.; and Bouteiller, Charles A., 3,865,161.

New Nippon Electric Company Ltd.: *See—*
Kaneda, Isao; and Takeuchi, Kiyokazu, 3,866,088.

Newbury, Ray S.; and Tully, Geoffrey R., Jr., to United States of America, Atomic Energy Commission. Method for coating uranium impregnated graphite with zirconium carbide. 3,865,614, Cl. 117-46.0CA.

Newcomer, William P., Jr., to Dylaker Computer Systems, Inc. Flexible tape reel. 3,865,325, Cl. 242-68.500.

Newell, E. Strohm. Locking handle. 3,865,500, Cl. 403-359.000.

Newman, Howard F. Catamaran righting apparatus and method. 3,865,061, Cl. 114-39.000.

Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, to Lever Brothers Company. Blue cheese flavor. 3,865,952, Cl. 426-65.000.

Neznamov, Jury Nikolaevich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

NHK Spring Co., Ltd.: *See—*
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Nilsson, Jan: *See—*
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Nippon Concrete Industries Co. Ltd.: *See—*
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Nippon Electric Company, Limited: *See—*
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Tajima, Mutsunari; and Komatsu, Isao, 3,866,151.
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Nippon Hoso Kyokai: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.
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Nippon Kokan Kabushiki Kaisha: *See—*
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Nippon Kokuyu Tetsudo: *See—*
Takahashi, Hikoji; Misawa, Seisuke; Takahashi, Akinori; and Yoshimura, Hisashi, 3,865,202.

Nippon Steel Corporation: *See—*
Matsumoto, Tadashi; and Yoshida, Takashi, 3,866,015.
Sekino, Shozo; Sakakihara, Mizuo; and Murota, Shoji, 3,865,581.
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Nippon Telegraph and Telephone Public Corporation: *See—*
Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, 3,865,971.
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Nippon Tsu Shin Kogyo K.K.: *See—*
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Nippondenso Co., Ltd.: *See—*
Ito, Shinichi; and Saji, Hideo, 3,864,821.
Nagai, Yukio, 3,866,072.

Nishikaku, Shinzo: *See—*
Okamoto, Miyoshi; Yoshida, Shusuke; Imai, Tadashi; Watanabe, Tatsuo; and Nishikaku, Shinzo, 3,865,678.

Nishimaru, Hiroji: *See—*
Nakajima, Hitoshi; and Nishimaru, Hiroji, 3,865,864.

Noe, Robert Joseph, to Agfa-Gevaert N.V. Electrophographic bichargeable materials and process. 3,865,587, Cl. 96-1.0PC.

Noguchi, Masaru: *See—*
Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, 3,865,478.

Nomiya, Kosei: *See—*
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Nordon Industries,Inc.: *See—*
Burzen, Norman J., 3,866,101.

Norman, Ralph L.; Hagood, Jerry W.; and Shelton, Joe. Image orthicon. 3,866,078, Cl. 313-377.000.

Normand, Floyd L.: *See—*
Daigle, Donald J.; Pepperman, Armand B., Jr.; and Normand, Floyd L., 3,865,618.

Noro, Hiroo: *See—*
Oya, Seigo; Noro, Hiroo; and Suzuki, Kisaburo, 3,865,779.

Norris, Dale M.; Reynolds, John F.; and Carroll, Raymond L. Method and apparatus for introducing a fluid into the vascular system of a tree or similar plant. 3,864,874, Cl. 47-57.500.

Norris, Russell; and Woodiwiss, Charles R., to Procter & Gamble Company, The. Crystallization seed-containing detergent composition. 3,865,754, Cl. 252-532.000.

Norris, Walter R., to Anaconda Company, The. Nonmetallic sheathed cable. 3,865,972, Cl. 174-115.000.

Norstrom, Lars-Ake: *See—*
Hellner, Lars Ivar; Johansson, Hans Elof; and Norstrom, Lars-Ake, 3,865,644.

North American Philips Corporation: *See—*
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North American Rockwell Corporation: *See—*
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North Electric Company: *See—*
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North, William D.: *See—*
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Northrop Corporation: *See—*
Benneche, Chris; Brochu James W.; and Conner, Jack S., 3,866,226.

Northup, Francis B.; and Hart, Donald R. Apparatus and method for wrapping core yarns. 3,864,900, Cl. 57-16.000.

Norton, Calhoun, to Arens Controls, Inc. Electrical steering system for boats. 3,865,063, Cl. 114-144.00R.

Norton-McMurray Manufacturing Company: *See—*
Chen, Keith A., 3,865,410.

Norton, Robert L.: *See—*
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Noshiro, Atsumi: *See—*
Ohto, Michihiro; Noshiro, Atsumi; Mayuzumi, Tetsuya; and Fujino, Toji, 3,865,588.

Novello, Frederick C.: *See—*
Baldwin, John J.; and Novello, Frederick C., 3,865,945.

Novitsky, Vasily Mikhailovich: *See—*
Turkevich, Nikolai Mikhailovich; Olievskaya, Maria Stepanovna; Pashkevich, Julia Maximovna; Potopalsky, Anatoly Ivanovich; and Novitsky, Vasily Mikhailovich, 3,865,830.

Nuclear Equipment Corporation: *See—*
Grund, J. Evan, 3,866,044.

Numajiri, Kenji: *See—*
Matsufuji, Akira; and Numajiri, Kenji, 3,864,952.

Nutt, David Walter: *See—*
Boothman, David Richard; and Nutt, David Walter, 3,866,094.

Nysted, Leonard N., to G. D. Searle & Co. Methylenation reagent. 3,865,848, Cl. 260-346.10M.

O'Brien, Darrell E.: *See—*
Kobe, Joze; O'Brien, Darrell E.; and Robins, Roland K., 3,865,824.

O'Brien, Patrick J.: *See—*
Fielding, Lawrence E.; and O'Brien, Patrick J., 3,865,333.

Oda, Yoshio; Uchida, Keiichi; and Morimoto, Takeshi, to Asahi Glass Co., Inc. Process for preparing acrylic acid and or methacrylic acid from acrolein or methacrolein. 3,865,873, Cl. 260-530.00N.

Odetics, Inc.: *See—*
Welch, James P.; and Siegel, Stephen R., 3,865,981.

Officina Meccanica Erba & C. Soc. Acc. Semplice: *See—*
Erba, Giancarlo; and Arsizio, Busto, 3,865,020.

Ogata, Masaru: *See—*
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Ogawa, Kenzo: *See—*
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Ohiwa, Hajime: *See—*
Goto, Eiichi; Ohiwa, Hajime; Iwata, Kansei; and Urano, Tadao, 3,866,207.

Ohkubo, Kinji; and Kato, Kazunobu, to Fuji Photo Film Co., Ltd. Image-receiving element for use in photographic silver salt diffusion transfer process. 3,865,592, Cl. 96-76.00R.

Ohmstedt, Harry O.; Ruth, William H.; and Gibbs, Edward E., to General Electric Company. Cartridge brush holder. 3,864,803, Cl. 29-205.00R.

Ohno, Kunio: *See—*
Kazama, Ken; Ohno, Kunio; Umegae, Mamoru; and Yonei, Mineko, 3,865,284.

Ohta, Susumu: *See—*
Maezawa, Keizo; and Ohta, Susumu, 3,866,103.

Ohto, Michihiro; Noshiro, Atsumi; Mayuzumi, Tetsuya; and Fujino, Toji, to Dai Nippon Printing Co., Ltd.; and Shinetsu Chemical Company. Planographic plate with a polymerizable organopolysiloxane compound. 3,865,588, Cl. 96-33.000.

Ohtsuka, Yozo, to Sagami Chemical Research Center. Process for preparing monoformyldiaminomaleonitrile. 3,865,862, Cl. 260-465.400.

Oka, Takeshi, to Bridgestone Tire Company Limited. Patterned rubber article and a process for making the same. 3,865,663, Cl. 156-116.000.

Okamoto, Miyoshi; Yoshida, Shusuke; Imai, Tadashi; Watanabe, Tatsuo; and Nishikaku, Shinzo, to Toray Industries, Inc. Suede-like raised woven fabric and process for the preparation thereof. 3,865,678, Cl. 161-67.000.

Okamura, Tadasu. Toilet paper roll holding device. 3,865,295, Cl. 225-47.000.

Oki Electric Industry Co., Ltd.: *See—*
Kobayashi, Masaki; Kawakami, Izumi; and Gunji, Katuhiko, 3,866,155.

Okumura, Shinji; Yoshinago, Fumihiro; Kubota, Koji; and Kamijo, Hirotaka, to Ajinomoto Co., Inc. Fermentative production of L-leucine. 3,865,690, Cl. 195-28.00R.

Okuto, Koichiro; and Kai, Toshio, to Sumitomo Metal Industries Limited. Slip joint for steel poles or the like. 3,865,498, Cl. 403-292.000.

Olievskaya, Maria Stepanovna: *See—*
Turkevich, Nikolai Mikhailovich; Olievskaya, Maria Stepanovna; Pashkevich, Julia Maximovna; Potopalsky, Anatoly Ivanovich; and Novitsky, Vasily Mikhailovich, 3,865,830.

Olin Corporation: *See—*
Schnabel, Wilhelm J., 3,865,761.

Olin, John F.; and Hamm, Philip C., to Monsanto Company. Metabifunctional benzenes. 3,865,867, Cl. 260-472.000.

Olsson, Karl Erik: *See—*
Boksjo, Carl Ingvar; and Olsson, Karl Erik, 3,865,438.

O'Neill, Gerald Joseph; Simons, Charles William; and Billings, Charles Alden, to W. R. Grace & Co. Methylcyclopropane anesthetics. 3,865,950, Cl. 424-352.000.

Onischak, Michael: *See—*
Gidaspow, Dimitri; and Onischak, Michael, 3,865,924.

Ono, Nobuyuki: *See—*
Ishino, Takeshi; and Ono, Nobuyuki, 3,866,009.

Ooishi, Tadashi: *See—*
Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, 3,865,866.

Oosawa, Kooichi: *See—*
Matusdo, Kazuo; Shimomura, Takayoshi; and Oosawa, Kooichi, 3,865,637.

Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, to Fuji Photo Film Co., Ltd. Microfilm projecting system. 3,865,478, Cl. 353-26.000.

Opti-Holding AG: *See—*
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Optotechnik Heine KG: *See—*
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Kelermeier, Robert J.; Knight, James T.; and Steljes, Bernadine E., 3,865,964.

Orehoski, Michael A.: *See—*
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Oringer, Kenneth: *See—*
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Ornstein, Jacob L., to Texas Instruments Incorporated. Composite thermostat metal. 3,865,559, Cl. 29-195.500.

Ortho Pharmaceutical Corporation: *See—*
Hartop, William L., 3,865,108.

Ortiz, Remey: *See—*
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Osborn, Anthony Raymond: *See—*
Baker, Francis Sidney; Harrison, Charles Richard; Osborn, Anthony Raymond; and Williams, John, 3,866,077.

Osborn, Jack S. Selective plugging of filter elements. 3,865,561, Cl. 55-18.000.

Oshima, Shigeru, to Fuji Photo Film Co., Ltd. Film cartridge. 3,865,327, Cl. 242-71.200.

Ossko, Andreas; Goller, Heinz; Herzig, Joachim; Buchner, Werner; and deMontigny, Armand, to Bayer Aktiengesellschaft. Hydrosilylation employing dicarbonyldichloroplatinum as a catalyst. 3,865,858, Cl. 260-448.20E.

Ostbo, Karl Robert Ambjorn. Heat exchanger. 3,865,185, Cl. 165-165.000.

Osterreichische Stickstoffwerke Aktiengesellschaft: *See—*
Stich, Heinrich; Binder, Walter; Hutter, Josef; and Marecek, Helmut, 3,865,602.

Ostrenko, Viktor Yakovlevich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Ostwald, Fritz, to ITT Industries, Inc. Hydraulic braking system with a plurality of booster control valves connected in series. 3,865,440, Cl. 303-21.00F.

Othen, Sidney Arthur; and Morris, John, to Joseph Lucas (Industries) Limited. Control apparatus for hydraulic transmission system. 3,864,912, Cl. 60-431.000.

Otis Engineering Corporation: *See—*
Young, Carter R., 3,865,408.

Ouska, Ralph Charles, to FMC Corporation. Roller band mechanism and suspension system for oscillating conveyors. 3,865,231, Cl. 198-220.0CA.

Overgard, Russell G.: *See—*
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Overhead Door Corporation: *See—*
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Overlach, Knud: *See—*
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Owens-Corning Fiberglas Corporation: *See—*
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Marzocchi, Alfred, 3,865,682.
Spence, Harry E.; and Warden, Charles B., 3,865,565.

Owens, Frederick J.; and Bishop, Jerry B. Artificial-horizon gyroscope. 3,864,838, Cl. 33-329.000.

Owens-Illinois, Inc.: *See—*
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McColl, Bruce John, 3,865,160.

Oya, Seigo; Noro, Hiroo; and Suzuki, Kisaburo, to Hiromichi Murata. Process for preparing reinforcing additives to be applied to inorganic cements. 3,865,779, Cl. 260-42.440.

Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, to Sumitomo Chemical Company, Limited. Carbamic acid esters. 3,865,866, Cl. 260-471.00C.

P. Ferrero & C. S.p.A.: *See—*
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P. R. Mallory & Co. Inc.: *See—*
Borbely, Alexander S.; and Bereman, Jon A., 3,865,608.
Underwood, David W.; and Chestnut, Benjamin F., 3,866,002.

Padawer, Jacques, to Albert Einstein College of Medicine of Yeshiva University. Analytical apparatus and process. 3,865,548, Cl. 23-230.00R.

Paddington, Arthur Loftus, to British Ropes Limited. Pipe couplings. 3,865,409, Cl. 285-18.000.

Padgett, Brian: *See—*
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Painter, Howard S.; and Armstrong, Donald E., to GTE Sylvania Incorporated. Moisture indicator for photoflash lamp. 3,865,537, Cl. 431-13.000.

Palenchar, Daniel P.; Lehker, Wayne H.; and Lock, David P., to Sperry Rand Corporation. Universal motor control. 3,866,100, Cl. 318-257.000.

Palfi, Thomas L.: *See—*
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Palitex Project Company GmbH: *See—*
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Pall, David B.; and Jasaitis, Tadas K. Cylindrical filter elements with improved side seam seal. 3,865,919, Cl. 264-259.000.

Pallet Development Inc.: *See—*
Melnick, Dennis M.; and Kubick, Mark, 3,865,024.
Melnick, Dennis M.; and Kubick, Mark, 3,865,391.

Palush, Bernard P. Positive pressure breathing circuit. 3,865,106, Cl. 128-145.800.

Panduit Corporation: *See—*
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Moody, Roy A.; and Roberson, Raymond F., 3,865,156.

Pankove, Jacques Isaac, to RCA Corporation. Method for diffusing impurities into nitride semiconductor crystals. 3,865,655, Cl. 148-189.000.

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Park Chemical Co.: *See—*
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Parker, Alan James; Waghorne, Winfield Earle; Giles, Dion Ewing; Sharp, John Howard; Alexander, Robert; and Muir, David Michael. Method of producing copper and composition therefor. 3,865,744, Cl. 252-188.30R.

Parker, Robert, to Robert Parker Research, Inc. Reusable bottle thermometer. 3,864,976, Cl. 73-356.000.

Parnell, Edgar William: *See—*
Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, 3,865,948.

Parson, Brinckerhoff, Quade & Douglass, Inc.: *See—*
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Parups, Edwin V.; and Chan, Allan P., to Canadian Patent and Development Limited. Preservation of cut blooms. 3,865,569, Cl. 71-68.000.

Paschenko, Viktor Prokhorovich: *See—*
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Pase, Hugh H., to Mimco Incorporated. Apparatus for unloading bulk material. 3,865,347, Cl. 254-124.000.

Pashkevich, Julia Maximovna: *See—*
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Patriquin, George P., to Hudson Lock, Inc. Automatic key duplicating apparatus. 3,865,011, Cl. 90-13.050.

Patterson, Richard J. Prescription form filing system. 3,865,447, Cl. 312-234.200.

Paulson, Donald L.; and Mamo, Anthony C., to Borg-Warner Corporation. Connecting device for plastic encased hydrotherapy plinth. 3,865,104, Cl. 128-66.000.

Pauza, William Vito; and Poltonavage, Edward Michael, to AMP Incorporated. Circuit panel connector. 3,865,458, Cl. 339-91.00R.
Pauze, Denis R., to General Electric Company. Polyesteramideimides. 3,865,785, Cl. 260-75.00N.
Pavlicek, Miroslav; and Rosenbaum, Miroslav, to Ustav pro vyzkum rud. Absorption photometer. 3,865,494, Cl. 356-201.000.
Paxhia, Vincent B.; and Bossler, Franklin B., to Textron, Inc. Quiet jet discharge nozzle. 3,865,311, Cl. 239-568.000.
Payet, George L.: *See—*
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Payne, Bernard M.: *See—*
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Payne, Louis B.; and Overgard, Russell G. Locking device with alarm utilizing flexible gas impermeable tube. 3,866,205, Cl. 340-280.000.
Peardon, David L.: *See—*
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Pearson, Leonard Louis; and Plaisted, Anthony Cecil, to Fosroc AG. Soil consolidation. 3,865,600, Cl. 106-84.000.
Pedersen, Richard Alan, to Bell Telephone Laboratories, Incorporated. Power supply distribution for integrated circuits. 3,866,066, Cl. 307-297.000.
Pedro, Eugene M., to Carl Pedro and Sons, Inc. Weapons case. 3,865,166, Cl. 150-52.00R.
Pekko, John A.; and Richardson, Wayne L., to Avery Products Corporation. Destructible label system. 3,864,855, Cl. 40-2.00R.
Pennewiss, Horst; Plainer, Hermann; and Schleier, Waldemar, to Rohm GmbH. Anti-fogging hydrophilic resin coatings. 3,865,619, Cl. 117-138.800.
Pentron Industries, Inc.: *See—*
Sampey, Harry R., 3,865,305.
Pepperman, Armand B., Jr.: *See—*
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Perkins, Clive: *See—*
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Perkons, George; and Schailey, Orrell B., to Earle Gear and Machine Company, The. Bridge-operating machinery. 3,864,777, Cl. 14-38.000.
Perlman, Marvin: *See—*
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Petersen, Siegfried: *See—*
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Peterson, David Ernest: *See—*
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Peterson, Eldon L. Garment hanger. 3,865,287, Cl. 223-96.000.
Peterson, Francis C., to Hinge Manufacturing Company. Security system and lock therefor. 3,866,164, Cl. 340-274.000.
Peterson, Ralph L. Apparatus for moving a plug fitting. 3,865,129, Cl. 137-315.000.
Petersson, Bengt Olov. Device for compensating excess pressures in closed containers. 3,865,270, Cl. 220-85.00B.
Petre, James Gusten Ragnar: *See—*
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Petrea, James C., to Wright Machinery Company, Inc. Multi-pack method and apparatus. 3,864,895, Cl. 53-159.000.
Petry, Charles J., to Hazelett Strip-Casting Corporation. Method and apparatus for determining the operating conditions in continuous metal casting machines of the type having a revolving endless casting belt. 3,864,973, Cl. 73-295.000.
Petrykowski, Thomas F.: *See—*
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Pfeifer, Hermann. Apparatus for lifting and transporting goods by means of a hoist. 3,865,421, Cl. 294-67.0AB.
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Phal, Karl-Heinz. Handrail for escalator. 3,865,225, Cl. 198-16.00R.
Phelan, Lawrence W., Jr., to Armstrong Cork Company. Single pass multi-colored screen printing. 3,865,032, Cl. 101-129.000.
Phillips, Michael R.; and Ludwig, Jerome H., to Queensbury Opal Co. Ltd. Doublet having fiber optical element for chatoyant or asterismal display. 3,864,939, Cl. 63-32.000.
Phillips Petroleum Company: *See—*
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Banks, Robert L.; and Kenton, Joseph R., 3,865,751.
Mills, King L., 3,865,925.
Moberly, Charles W., 3,865,795.
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Warner, Paul F., 3,865,714.
Zuech, Ernest A., 3,865,892.
Phipps, Richard John, to Camper & Nicholsons (Holdings) Limited. Purification control unit. 3,865,710, Cl. 204-228.000.
Piereder, Ludwig, to A.B.R. Food Machinery (Canada) Limited. Meat packaging and pressing apparatus and method. 3,864,891, Cl. 53-35.000.
Pietzsch, Ludwig: *See—*
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Pike, Edward Roy, to National Research Development Corporation. Laser doppler velocimetry. 3,866,055, Cl. 250-564.000.
Pilhall, Stig Tore Lennart; Schalin, Pehr Harald Benedictus; Bohlin, Nils Ivar; and Forsberg, Rolf Hermann, to A B Volvo. Vehicle safety belt systems. 3,865,397, Cl. 280-150.0SB.
Pines, Arthur Noah: *See—*
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Pioneer Science Limited: *See—*
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Piotin, Maurice Joseph, to Subsea Equipment Associates Ltd. Diving bell for wellhead placing and maintenance in shallow water. 3,864,924, Cl. 61-69.00R.
Pittman, Robert B., to Industrial Electronic Hardware Corporation. Spark gap protection in cathode ray tube sockets. 3,865,452, Cl. 339-14.00T.
Pitts, Frank; and Clubley, Michael Hilton, to Magnesium Elektron Limited. Flame retardant materials. 3,865,760, Cl. 260-2.5AJ.
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Platt, Stephen A., to Platt, Steven A.; and Platt, Vernon B. Sound reproduction apparatus with improved accoustical transmission means. 3,865,385, Cl. 274-25.000.
Platt, Steven A.: *See—*
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Poole, Emory Donald, to Spring Mills, Inc. Jumbo cloth take-up and inspection apparatus for textile loom. 3,865,151, Cl. 139-304.000.
Popelak, Alfred; Stach, Kurt; Thiel, Max; Schaumann, Wolfgang; and Stork, Harald, to Boehringer Mannheim G.m.b.H. (5-Indolyloxy)-acetic acid compounds and therapeutic compositions. 3,865,838, Cl. 260-326.13R.
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Greenberg, Charles B., 3,865,747.
Reese, Thomas J.; and Koontz, Harry S., 3,865,680.
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Quigg, Harold T., to Phillips Petroleum Company. Combustor and combustion apparatus. 3,865,538, Cl. 431-215.000.
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Radler, Richard W., Jr.; Millonzi, Richard P.; and Bergfjord, John A., to Xerox Corporation. Photoactive polymers; induced exocyclic quartet concept. 3,865,798, Cl. 260-88.30R.
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Lieb, Philip C.; and Kesselman, David A., 3,865,246.
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Randolph, John L. Bowling ball. 3,865,369, Cl. 273-63.00E.
Rane, Subhash R.: *See—*
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Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.
Raschke, Curt Robert, to Addressograph-Multigraph Corporation. Method for toning a latent image. 3,865,609, Cl. 117-17.500.
Rase, Howard F.; and Maddox, Larry A., to Exxon Research and Engineering Company. Titanium carbide catalysts, and the catalyst compositions. 3,865,750, Cl. 252-443.000.
Rauchwerger, George P. Capacitance probe and system for precision measurement of liquid level. 3,864,974, Cl. 73-304.00C.
Ray, Clifford H.: *See—*
Barr, Frederick J., Jr.; Mayne, W. Harry; and Ray, Clifford H., 3,866,161.
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Reber, Rudi; and Herzog, Robert, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Resistance thermometer. 3,866,158, Cl. 338-25.000.
Redelman, Paul E., to Interlake, Inc. Load carrier transfer. 3,865,266, Cl. 214-515.000.
Reed, Benjamin H.; and Black, Rexford E. Electrolytic etch apparatus and method. 3,865,704, Cl. 204-129.200.
Reed, Russell, Jr.: *See—*
Munson, William O.; and Reed, Russell, Jr., 3,865,035.
Reed, Terry J.; and Reuther, John F., to Westinghouse Electric Corporation. Digital computer control system and method for monitoring and controlling operation of industrial gas turbine apparatus employing expanded parametric control algorithm. 3,866,109, Cl. 322-15.000.

Rees, J. Samuel: *See—*
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Reese, Thomas J.; and Koontz, Harry S., to PPG Industries, Inc. Automobile windshield and its method of fabrication. 3,865,680, Cl. 161-125.000.
Reeves, Jerry H.: *See—*
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Regie Nationale des Usines Renault: *See—*
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Maistrelli, Roger A.; Pruvot, Francois C.; and Poletti, Henri, 3,864,916.
Rivere, Jean-Pierre, 3,864,963.
Reigler, Paul F.; and Lamoria, Lz F., to Dow Chemical Company, The. Preparation of aluminum hydride. 3,865,928, Cl. 423-645.000.
Reimers, Eberhart. Electrochemical cell having heat pipe means for increasing ion mobility in the electrolyte. 3,865,630, Cl. 136-86.00A.
Reimers Electric Steam, Inc.: *See—*
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Reinhardt, Helmut; Trebinger, Karl; Kallrath, Gottfried; and Weber, Helmut. Process for decontamination of hardening salt residue. 3,865,921, Cl. 423-164.000.
Reinhart, Franz Karl: *See—*
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Reinwall, Ernest William, Jr. Rope lock device. 3,864,790, Cl. 24-129.00R.
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Reliance Electric Company: *See—*
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Remeika, Joseph Peter; Voorhoeve, Rudolf Johannes; and Bell Telephone Laboratories, Incorporated. Catalyst activation process and product thereof. 3,865,752, Cl. 252-462.000.
Remswerk Christian Foll & Sohne: *See—*
Fohl, Arthur, 3,864,774.
Repetto, Silvio, to S.p.A. Luigi Rizzi & Co. Blade sharpening apparatus. 3,864,880, Cl. 51-247.000.
Repiquet, Gerard; and Crouzet, Jean Claude, to Naphtachimie. Flexible polyurethane foams prepared by the using a mixture of polyether-polyols and mixtures of polyisocyanates. 3,865,762, Cl. 260-2.5AP.
Research-Cottrel, Inc.: *See—*
Lefevre, Marcel R., 3,865,911.
Resitron Corporation: *See—*
Wade, Robert C., 3,865,757.
Resnick, Paul Raphael. Fluorinated dioxoles. 3,865,845, Cl. 260-340.900.
Reuschel, Konrad, to Siemens Aktiengesellschaft. Method for precipitation of semiconductor material. 3,865,647, Cl. 148-175.000.
Reuter, Frederick A.: *See—*
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Reuter, Fritz; and Jung, Horst, to Eberspacher, J. Means for controlling the course of operation of an auxiliary heating system in motor vehicles or ships. 3,865,306, Cl. 237-2.00A.
Reuther, John F.: *See—*
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Richardson, Kenneth J., to Hoffmann-La Roche Inc. Horological instrument incorporating means for illuminating a liquid crystal display. 3,864,905, Cl. 58-50.00R.
Richardson, Wayne L.: *See—*
Pekko, John A.; and Richardson, Wayne L., 3,864,855.
Richey, Curry E., Jr., to Avco Corporation. Costume jewelry with light-emitting diode. 3,866,035, Cl. 240-6.40W.
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Ridgway, John A., Jr.; Lappin, Terry A.; Benjamin, Benny Moses; Corns, Joseph B.; and Akin, Cavit, to Standard Oil Company. Single-cell protein materials from ethanol. 3,865,691, Cl. 195-49.000.
Ried, Louis, Jr., to Fire-Alert Company. Combustion product detector and method of calibrating. 3,866,195, Cl. 340-237.00S.
Riedel, Manfred; and Wolf, Rainer. Flame-retardant regenerated cellulose. 3,865,604, Cl. 106-168.000.
Riegel, Herbert: *See—*
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Rieter Machine Works, Ltd.: *See—*
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Rieux, Jean-Philippe; and Lehureau, Jean, to Rhone-Progil. Process for modifying the surface characteristics of carbon substrates and composite articles produced from the treated substrates. 3,865,705, Cl. 204-130.000.
Rijpers, Johannes Cornelis Norbertus: *See—*
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Rikagaku Kenkyusho: *See—*
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Riley, Clifford, to Wellcome Foundation Limited, The. Auto-analytical apparatus and analytical methods. 3,865,549, Cl. 23-230.00R.
Rimini, Tito, to Bras S.p.A. Beverage-dispensing machine. 3,865,277, Cl. 222-146.0HE.
Risi, Walter; and Knecht, Rudolf, to G & W Maschinen AG. Method and apparatus of handling wound skeins. 3,864,796, Cl. 28-21.000.
Ritchie, Douglas E.: *See—*
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Rite Autotronics Corporation: *See—*
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Rivere, Jean-Pierre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Methods and devices for measuring instantaneously a mean pressure in a fluid medium. 3,864,963, Cl. 73-115.000.
Robba, Max Fernand; and Duval, Denise Jeanne Claude, to Innothera. Beta-[benzo(b) thienyl-3]-alpha-allyl-propionic acid esters. 3,865,842, Cl. 260-330.500.
Robbins, Geoffrey. Combination pen and pencil writing device. 3,865,496, Cl. 401-17.000.
Roberson, Raymond F.: *See—*
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Robert Bosch, G.m.b.H.: *See—*
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Roberts, Carolyn G. Spectacle attachment. 3,865,473, Cl. 351-113.000.
Roberts, James R.; and Nason, Stephen G., to United States Gypsum Company. Process for separating fibrous material. 3,865,315, Cl. 241-4.000.
Robertson, James H. Bracket and shelf support assembly. 3,865,336, Cl. 248-235.000.
Robichaud, Robert H., to Texas Instruments Incorporated. Medical electrode and method of making. 3,865,099, Cl. 128-2.10E.
Robins, Roland K.: *See—*
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Robinson, Donald B., to Sage Laboratories, Inc. Latch for microwave oven. 3,865,097, Cl. 126-197.000.
Robinson, George H.: *See—*
Ballantyne, David B.; Mantel, Edward R.; and Robinson, George H., 3,865,638.
Robison, Samuel Clifford: *See—*
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Robot Foto Und Electronic GmbH & Co. KG: *See—*
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Robson, Harry E., to Exxon Research and Engineering Company. Process for the hydrogenation of unsaturated hydrocarbons with chrysotile catalyst compositions. 3,865,895, Cl. 260-683.900.
Rochfort, William P. K., to Kerbit Pty. Ltd. Pavement, curb and gutter concrete laying machine. 3,864,858, Cl. 404-98.000.
Rock, Howard P. Needle valve vapor injection and method. 3,865,907, Cl. 261-18.00A.
Rockwell International Corporation: *See—*
Debloois, Roger C.; and Hogue, Noel E., 3,866,133.
Krause, Melvin G., 3,866,130.
Watson, James C.; and Hebert, Roy J., 3,864,824.
Roden, John S.; Kirkevold, Kent A.; Tritle, Gary L.; and Sjerven, Gene A., to Minnesota Mining and Manufacturing Company. Magnetic recording medium incorporating fine acicular iron-based particles. 3,865,627, Cl. 117-240.000.
Roeder, George K. Fluid actuated down-hole pump. 3,865,516, Cl. 417-403.000.
Roeder, Robert J., to Kimberly-Clark Corporation. Small size sanitary napkins with improved absorption capability. 3,865,112, Cl. 128-290.00R.
Roess, Louis G., to Moog Inc. Extrusion apparatus having electronic interpolator. 3,865,528, Cl. 425-145.000.
Rogers, Dale R. Survival hand weapon. 3,865,370, Cl. 273-84.000.
Rogers, Walter Clark, Jr.; and Snitzer, Morton, to Royal Development Company, Inc. Reclining chair. 3,865,432, Cl. 297-316.000.
Rohm GmbH: *See—*
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Pennewiss, Horst; Plainer, Hermann; and Schleier, Waldemar, 3,865,619.

Rohm and Haas Company: *See—*
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Rohr, Wolfgang; and Fischer, Adolf. Substituted sulfonylglycolic acid anilides. 3,865,860, Cl. 260-456.00A.

Rohrberg, Roderick, to North American Rockwell Corporation; and Air Products and Chemicals, Inc., part interest to each. Art of casting metals. 3,865,173, Cl. 164-46.000.

Roller, William G.; and West, Emery L., to said Roller, by said West. Bow bracket mounting for an electric trolling motor. 3,865,335, Cl. 248-4.000.

Roller, William G.: *See—*
Roller, William G.; and West, Emery L. (assors. to said Roller, by said West), 3,865,335.

Romanchak, Joseph: *See—*
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Romano, Anthony J.: *See—*
Klein, James H.; Romano, Anthony J.; Kukacka, Lawrence E.; and Fedelem, Joseph J., 3,865,075.

Root, Charles M. Splitter head with spreader arms. 3,865,163, Cl. 144-193.00A.

Rordorf, Horst, to Elektrophysikalische Anstalt Bernhard Berhaus. Suspension device for workpieces to be treated in an electrical glow discharge. 3,865,451, Cl. 339-8.00R.

Rose, Peter: *See—*
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Rosenbaum, Miroslav: *See—*
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Rosenberg, Robert B.: *See—*
Solbrig, Charles W.; Weil, Sanford A.; and Rosenberg, Robert B., 3,865,070.

Rosenkranz, Otto; Rose, Peter; and Goos, Heinz. Method for controlling wall thickness during a blow-moulding operation. 3,865,912, Cl. 264-25.000.

Ross, Gerald F., to Sperry Rand Corporation. High frequency planar network with non-radiating circuit elements. 3,866,152, Cl. 333-20.000.

Ross, John Edward; Marshall, David James; and Chapman, Brian Samuel, to Wiggins Teape Research & Development Limited. Pressure-sensitive copying systems. 3,865,613, Cl. 117-36.800.

Ross, Joseph A.: *See—*
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Ross, Lloyd D. Safety hook. 3,865,423, Cl. 294-82.00R.

Rossberg, Peter: *See—*
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Rotax Limited: *See—*
Gomersal, Keith; and Padgett, Brian, 3,865,125.

Roth, Mario; Siemonsen, Hans Peter; Kuiff, Siegfried; and Moebs, Heinz, to Saint-Gobain Industries. Window. 3,865,558, Cl. 29-195.000.

Rothkegel, Bernhard: *See—*
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Rousey, William J.: *See—*
United States of America, National Aeronautics and Space Administration; Perlman, Marvin; Rousey, William J.; and Messner, Alan, 3,866,022.

Roush, Maurice D., to Control Data Corporation. Cooling systems for electronic modules. 3,865,183, Cl. 165-80.000.

Roussel-Uclaf: *See—*
Hainaut, Daniel; Toromanoff, Edmond; and Demoute, Jean-Pierre, 3,865,854.

Rovin, Herman; Kreidel, Rudolf; and Levine, Lawrence J., to Automatech Industries Inc. Method and apparatus for forming and joining hems, particularly on tubular articles. 3,865,058, Cl. 112-63.000.

Rowe, Arthur W.; and Marshall, Edward T., to Union Carbide Corporation. Sterile connector for conduits. 3,865,411, Cl. 285-363.000.

Roy James Dennis: *See—*
Dennis, Roy James; and Kielpikowski, Klemence, 3,865,065.

Roy, Prodyot; and Krankota, Jan L. Carbon activity meter. 3,865,709, Cl. 204-195.00R.

Royal Development Company, Inc.: *See—*
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Royal Industrial Inc.: *See—*
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Rubery Owen-Rockwell, Limited: *See—*
Mathers, Robert Valentine; and Unsworth, Derek, 3,864,800.
Mathers, Robert Valentine; and Thompson, Frederick, 3,865,395.

Rubin, Jack A.; and Johnson, Peter D., to United States of America, Atomic Energy Commission. $UO_2BeO$ fuel process. 3,865,746, Cl. 252-301.10W.

Rucker Company, The: *See—*
White, Robert Miles; and Bates, Howard John, 3,865,066.

Ruehmann, Donald W.: *See—*
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Ruf, Max: *See—*
Steinwart, Johannes; and Ruf, Max, 3,865,179.

Ruggeri, Luigi, to Ercole Marelli & C. S.p.A. Electrical generation and control device. 3,866,110, Cl. 322-57.000.

Ruhoff, David S.: *See—*
Demos, Gary A.; and Ruhoff, David S., 3,866,127.

Rumsey, Thomas R.: *See—*
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Russo, Michael T. Post cap lamp. 3,866,034, Cl. 240-2.00B.

Rust, Kurt: *See—*
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Ruth, William H.: *See—*
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Ruti Machinery Works, Ltd.: *See—*
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Rutile & Zircon Mines (Newcastle) Limited: *See—*
Dunn, Wendell E., Jr., 3,865,920.

Ruvin, Abraham Eli, to RCA Corporation. Doppler tracker receiver. 3,866,227, Cl. 343-106.00D.

Ryan, Philip M., to International Business Machines Corporation. Method and apparatus for controlling movable means such as an electron beam. 3,866,013, Cl. 219-121.0EM.

Rycroft, Alan, to Becton, Dickinson and Company. Needle shield. 3,865,236, Cl. 206-364.000.

S.A. Des Anciens Etablissements Paul Wurth: *See—*
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S.A. Francois Salomon & Fils: *See—*
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Saam, John C.: *See—*
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Sabetay, Leon, to Cegedur GP. Process for manufacturing decorative products of aluminum and alloys of aluminum. 3,865,560, Cl. 29-197.500.

Sacks, David M.: *See—*
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Saeki, Hiroshi: *See—*
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Sagami Chemical Research Center: *See—*
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Saiki, Atsushi: *See—*
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Saiki, Yoshiko; and Saiki, Atsushi. Laboratory analysis instrument. 3,865,551, Cl. 23-259.000.

Saint-Gobain Industries: *See—*
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Saji, Hideo: *See—*
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Sakai, Hiromichi: *See—*
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Sakakihara, Mizuo: *See—*
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Sakuma, Sankichi, to Takasago Perfumery Co., Ltd. Apparatus for expanding thermoplastic food in a vacuum. 3,865,532, Cl. 425-405.00R.

Salice, Luciano. Self-closing pivotal joint with concealed hinge. 3,864,786, Cl. 16-163.000.

Salminen, Rauno, to Yhtyneet Paperitehtaat Oy Jylhavaara. Pressure strainer device. 3,865,243, Cl. 209-240.000.

Salvinski, Richard J.: *See—*
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Sampatacos, Peter M.: *See—*
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Sampey, Harry R., to Pentron Industries, Inc. Programmable distance measuring instrument. 3,865,305, Cl. 235-92.0DN.

Sams, Ivan E.: *See—*
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Sandbrand-Nisipeanu, Zacharias: *See—*
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Sandco Ltd.: *See—*
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Sandfort, Robert T.: *See—*
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Sandvik Aktiebolag: *See—*
Hofvenstam, Ake Sixten Boris; Andersson, Erik Thomas; and Kallstrom, Olof Krister, 3,865,635.

Sango Co., Ltd.: *See—*
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Sankyo Company Limited: *See—*
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Sanyo Machine Works Ltd.: *See—*
Hashimoto, Hiroshi; Abe, Tetsuo; and Suzuki, Masao, 3,866,102.

Sanz, Manuel C.; Revillet, Georges; and Johnson, Edgar G., Jr., to Micromedic Systems, Inc. Cuvette for a microspectrophotometer. 3,865,495, Cl. 356-246.000.

Saper, Lawrence; Heller, George; and Hitchcoff, David, to Datascope Corporation. Portable and separable heart monitor and heart defibrillator apparatus. 3,865,101, Cl. 128-2.06R.

Sareen, Sarvajit S.; Girard, Lucien, III; and Hard, Robert A. Stimulation of recovery from underground deposits. 3,865,435, Cl. 299-5.000.

Sarlab Aktiengesellschaft: *See—*
Asher, Amram; and Eber, Nicolas, 3,864,937.

Sartori, Rolland: *See—*
Hautemont, Jean-Claude; and Sartori, Rolland, 3,864,998.

Sather, Delaine C.; and Lutz, Bruce C., to Collins Radio Company. Serial binary number and BCD conversion apparatus. 3,866,213, Cl. 340-347.0DD.

Sato, Masamichi; and Fukushima, Osamu, to Xerox Corporation. Method for electrostatic image development employing toner and carrier supported by a conductive liquid electrode surface. 3,865,611, Cl. 117-17.500.

Sato, Tadashi: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Sato, Tadashi; and Mori, Takao. 3,865,726.

Sato, Toshihiko: *See—*
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Savage, Sidney Clifford; and Stock, Peter Sinclair, to Wildt Mellor Bromley Limited. Pattern-selecting devices for knitting machines. 3,864,942, Cl. 66-50.00R.

Saver-Allma GmbH, Allgaver Maschinenbau: *See—*
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Savitsky, Evgeny Mikhailovich: *See—*
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Sawabe, Eiichi: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.

Sawaguchi, Hiroshi: *See—*
Kobayashi, Teruo; Inoue, Kazuo; and Sawaguchi, Hiroshi, 3,865,817.

Sawayama, Yoshihiko; and Hirai, Kenji. Microwave oscillator. 3,866,144, Cl. 331-107.00G.

Sawyer, Benjamin Robinson: *See—*
Brunger, William Ernest; Madden, Stanley Gordon; and Sawyer, Benjamin Robinson, 3,864,862.

Sawyer, Willard C., to Gorham International Inc. Method and apparatus for drying continuous sheets. 3,864,842, Cl. 34-41.000.

Saxl, Karel; and Hall, George, to Imperial Metal Industries (Kynoch) Limited. Safety systems. 3,865,415, Cl. 293-86.000.

Saxl, Karel, to Imperial Metal Industries (Kynoch) Limited. Safety devices. 3,865,418, Cl. 293-89.000.

Sayles, Donald A. Combustible mixture analyzer. 3,865,707, Cl. 204-195.00S.

Scannell, James Parnell: *See—*
Berger, Julius; Pruess, David; and Scannell, James Parnell, 3,865,694.

Scata, Mario, to International Standard Electric Corporation. Safety tipping mechanism for tipping trays on a continuous conveyor. 3,865,226, Cl. 198-38.000.

Schailey, Orrell B.: *See—*
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Schalin, Pehr Harald Benedictus: *See—*
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Schenker, Barry A.; Kolb, James M.; and Franks, Charles R., to Diamond Shamrock Corporation. Electrowinning with an anode having a multicomponent coating. 3,865,703, Cl. 204-105.00R.

Scherer, Cyril George: *See—*
Hasselfof, Donald Elmer; and Scherer, Cyril George, 3,865,049.

Schick, Paul. Purification of bentonite. 3,865,240, Cl. 209-5.000.

Schieweck, Hubert; Steinle, Georg; and Haberl, Ludwig, to Sueddeutsche Zucker-Aktiengesellschaft. Low calorie sweetener and sweetener base. 3,865,957, Cl. 426-213.000.

Schindler, Harvey D.; Sze, Morgan C.; and Riegel, Herbert, to Lummus Company, The. Production of allyl chloride. 3,865,886, Cl. 260-654.00R.

Schiro, Luke J. Locking railroad spike. 3,865,307, Cl. 238-366.000.

Schirrmacher, Hermann: *See—*
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Schlafer, Ludwig; and Krell, Karl-Heinz, to Hoechst Aktiengesellschaft. Process for dyeing or printing polyamide or polyurethane fibres with anthraquinone-azo dyestuffs. 3,865,543, Cl. 8-39.000.

Schlage, Ernest L., to Schlage Lock Company. Thumb piece lock spindle actuator. 3,865,414, Cl. 292-336.300.

Schlage Lock Company: *See—*
Schlage, Ernest L., 3,865,414.

Schlegel, Kurt. Pretensioning apparatus for cam-driven reciprocating slide assembly. 3,864,981, Cl. 74-55.000.

Schleier, Waldemar: *See—*
Pennewiss, Horst; Plainer, Hermann; and Schleier, Waldemar, 3,865,619.

Schlossberg, Howard R.: *See—*
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Bell, William T., 3,864,970.
Dermott, Raymond W., 3,865,199.
Young, David E., 3,865,141.

Schmaldienst, Peter, to Robert Bosch, G.m.b.H. Magneto ignition system for internal combustion engines. 3,865,092, Cl. 123-148.00E.

Schmidt, Erich, to Maschinenfabrik Zuckermann Komm. Ges. Apparatus for shaping a wooden workpiece according to a template configuration. 3,865,162, Cl. 144-144.00R.

Schmidt, Erwin; and Beermann, Claus, to Hoechst Aktiengesellschaft. Phosphorus-containing polymers. 3,865,796, Cl. 260-80.0PS.

Schmidt, Hans-Joachim: *See—*
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Schmidt, Ludwig: *See—*
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Schmidt, Otto H.: *See—*
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Schmidt, Paul, to Tracto-Technik Paul Schmidt. Burrowing apparatus. 3,865,200, Cl. 175-19.000.

Schmidt, Richard F., to United States of America, America as represented by the National Aeronautics and Space Administration. Dish antenna having switchable beamwidth. 3,866,233, Cl. 343-761.000.

Schnabel, Wilhelm J., to Olin Corporation. Flame retardant polyurethane foam. 3,865,761, Cl. 260-2.5AJ.

Schnee, Karl; Tichy, Dieter; and Engelhardt, Friedrich, to Cassella Farbwerke Mainkur Aktiengesellschaft. Covered asbestos-cement products. 3,865,683, Cl. 161-205.000.

Schneider, Friedrich; and Stockel, Dieter, to G. Rau. Method of manufacturing a shaped element of fiber-reinforced material. 3,864,807, Cl. 29-419.00R.

Schneider, Joachim Ulrich: *See—*
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Schoettle, Klaus: *See—*
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Schontzler, James G.; Gates, Wendall C.; and DaGragnano, Victor L., to Manning Environmental Corporation. Fluid flow measuring system and method. 3,866,028, Cl. 235-151.340.

Schorr, Manfred; and Schrinner, Elmar, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Acylamino-cephalosporanic acids. 3,865,820, Cl. 260-243.00C.

Schreiner, Horst; and Rothkegel, Bernhard, to Siemens Aktiengesellschaft. Method for making an electric contact by powder metallurgy and the resulting contact. 3,864,827, Cl. 29-630.00C.

Schrinner, Elmar: *See—*
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Schrott, Erwin: *See—*
Gordon, Wolfgang; Rust, Kurt; and Schrott, Erwin, 3,865,902.

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Schubert, Hans-Werner; Behner, Otto; and Hoffmeister, Friedrich, to Bayer Aktiengesellschaft. 2'-[Hydroxyalkoxy]-6,7-benzomorphans. 3,865,834, Cl. 260-293.540.

Schuler, Max. Method for selective herbicidal treatment of cereal and carrot cultures. 3,865,571, Cl. 71-120.000.

Schulz, Gerhard; Matthias, Guenther; Kasper, Werner; and Haarer, Erich. Continuous production of diketene. 3,865,846, Cl. 260-343.900.

Schut, Theodore G. Television camera tube in which the detrimental effect of the return beam is counteracted. 3,866,079, Cl. 313-389.000.

Schwaab, Josef: *See—*
Metzinger, Lothar; Gottschalk, Alfred; Schoettle, Klaus; and Schwaab, Josef, 3,865,672.

Schwab, Delmar G.; and Graham, Dennis P., to Hyster Company. Hydraulic feed for wheel motors. 3,865,207, Cl. 180-44.00F.

Schwartz, Bertram: *See—*
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Schwartz, Dale R. Mounting unit for a tractor pulled mower. 3,865,404, Cl. 280-415.00A.

Schwartz, Edwin L., to Rite Autotronics Corporation. Test instrument for ignition systems. 3,866,113, Cl. 324-16.00R.

Schwartz, Norman; and Mohrbacher, Richard J., to McNeil Laboratories, Incorporated. Certain derivatives of pyrazinylmalonates and pyrazineacetic acids. 3,865,826, Cl. 260-247.50D.

Schwarz, Helmut: *See—*
Weitz, Hans-Martin; and Schwarz, Helmut, 3,865,800.

Schwarzler, Peter, to Krauss-Maffei Aktiengesellschaft. Device for detecting and controlling the spacing between two juxtaposed bodies. 3,865,043, Cl. 104-148.0MS.

Schwarzmann, Matthias: *See—*
Broecker, Franz Josef; Kaempfer, Knut; Marosi, Laslo; Schwarzmann, Matthias; and Triebskorn, Bruno, 3,865,753.

Schweicher, Wolfgang: *See—*
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Schweidler, Erich, to Saver-Allma GmbH, Allgaver Maschinenbau. Vise. 3,865,360, Cl. 269-100.000.

Schweitzer, Edmund O., Jr., to E. O. Schweitzer Manufacturing Co., Inc. Means for detecting fault current in a conductor and indicating same at a remote point. 3,866,197, Cl. 340-253.00A.

Scoggins, Lacey E.; and Edmonds, James T., Jr., to Phillips Petroleum Company. Arylene sulfide polymers. 3,865,794, Cl. 260-79.100.

Scope Incorporated: *See—*
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Seabold, Thomas W.: *See—*
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Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain, The: *See—*
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Segal, Leon, to Allied Chemical Corporation. Method for sealing shell-like thermoplastic objects. 3,865,662, Cl. 156-94.000.

Seifert, Karl-Heinrich: *See—*
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Seifert, Lloyd R., Jr.; and Hinrichs, Joel H., Jr., to NCR Corporation. Data communication system between a central computer and a plurality of data terminals. 3,866,175, Cl. 340-152.00R.

Seifried, Walter: *See—*
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Seiscom Delta Inc.: *See—*
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Seitz, Lamont J., to Baxter Laboratories, Inc. Filter skimming device. 3,865,731, Cl. 210-359.000.

Seitz, William K. Load transducer. 3,864,966, Cl. 73-141.00A.

Sekino, Shozo; Sakakihara, Mizuo; and Murota, Shoji, to Nippon Steel Corporation. Heat resistant alloy having excellent hot workabilities. 3,865,581, Cl. 75-122.000.

Sekmakas, Kazys, to DeSoto, Inc. Corrosion resistant and flexible aqueous coatings. 3,865,771, Cl. 260-29.300.

Selivanov, Gennady Dmitrievich: *See—*
Morgolenko, Anatoly Sergeevich; Selivanov, Gennady Dmitrievich; Fedosenko, Igor Grigorievich; Kononenko, Vadim Grigorievich; Filippov, Vladimir Vasilievich; Lushnikov, Leonid Georgievich; and Moiseeva-Smirnova, Zoya Alexandrovna, 3,864,996.

Semi, Yasushiro; and Ogawa, Kenzo. Automatic type-positioning device in photocomposer. 3,866,239, Cl. 354-8.000.

Semon, Warren L.: *See—*
Minnick, Robert C.; Bailey, Paul T.; Sandfort, Robert T.; and Semon, Warren L., 3,866,191.

Serafin, Frank G.; Previte, Robert W.; and Stierli, Robert F., to W. R. Grace & Co. Additive for improving hydraulic cement compositions. 3,865,601, Cl. 106-95.000.

Service Poly-Pak, Inc.: *See—*
Levy, Leonard P.; Kiesel, Joseph Anthony; and Honig, Murray H., 3,865,235.

Seymour, Robert John: *See—*
Dougherty, Joseph Patrick; Dalisa, Andrew Lawrence; and Seymour, Robert John, 3,866,187.

Shannon, John Martin; and Kerr, John Anthony, to U.S. Philips Corporation. Methods of manufacturing semiconductor bodies. 3,865,633, Cl. 148-1.500.

Sharon, Uzi; and Kaplan, Isaac, to Laser Industries, Ltd. Laser device particularly useful as surgical scalpel. 3,865,113, Cl. 128-303.100.

Sharon, Uzi, to Laser Industries, Ltd. Laser device particularly useful as a surgical instrument. 3,865,114, Cl. 128-303.100.

Sharp, John Howard: *See—*
Parker, Alan James; Waghorne, Winfield Earle; Giles, Dion Ewing; Sharp, John Howard; Alexander, Robert; and Muir, David Michael, 3,865,744.

Shaw, Benjamin Chandler, to Bendix Corporation, The. Starting circuit for inverter. 3,866,107, Cl. 321-45.00S.

Shearer, Gerald W.; and Wakida, Edward A., to Xerox Corporation. Digital interface module. 3,866,051, Cl. 250-551.000.

Sheetz, Charles E.; and McClintic, Wayne L., to FMC Corporation. Apparatus for transferring bags. 3,864,894, Cl. 53-63.000.

Shell Oil Company: *See—*
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Gergen, William P., 3,865,776.
Kohler, Jacques R.; and Van Amerongen, Gerrit J., 3,865,124.
McBeth, Clyde Warren, 3,865,938.
Titus, Paul E.; and Di Gregorio, Joseph S., 3,865,547.
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Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul, to Betz Laboratories, Inc. Slime control compositions and their use. 3,865,724, Cl. 210-62.000.

Sheratte, Martin B., to McDonnell Douglas Corporation. Functional fluids. 3,865,743, Cl. 252-78.000.

Sherborne, Michael C. D.: *See—*
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Shiba, Keisuke; Hinata, Masanao; Amano, Hiroyuki; and Hara, Hiroshi, to Fuji Photo Film Co., Ltd. Photographic silver halide emulsions. 3,865,598, Cl. 96-125.000.

Shibano, Naoki: *See—*
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Shimizu, Syozo; Shinohara, Hiroshi; Kondou, Toshihito; and Yamada, Norimasa, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of coating by redox polymerization. 3,865,617, Cl. 117-132.00C.

Shimizu, Takehiro; and Fukui, Tutomu. Automatic performance system for electronic instruments. 3,865,002, Cl. 84-115.000.

Shimoma, Takashi: *See—*
Emura, Tokumatsu; Kawabata, Shigeo; and Shimoma, Takashi, 3,866,053.

Shimomura, Takayoshi: *See—*
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Shimonaka, Takehiro: *See—*
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Shin, Kju Hi; and Zaweski, Edward F., to Ethyl Corporation. 0,0-Dialkyl-(3,5-dialkyl-4-hydroxybenzyl)dithiophosphate compositions and process for making same. 3,865,906, Cl. 260-953.000.

Shinetsu Chemical Company: *See—*
Katagiri, Kotaro; and Nakamura, Yoshio, 3,865,799.
Ohto, Michihiro; Noshiro, Atsumi; Mayuzumi, Tetsuya; and Fujino, Toji, 3,865,588.

Shinohara, Hiroshi: *See—*
Shimizu, Syozo; Shinohara, Hiroshi; Kondou, Toshihito; and Yamada, Norimasa, 3,865,617.

Shinohara, Isao: *See—*
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Shinoi, Tsuyoshi: *See—*
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Shionogi & Co., Ltd.: *See—*
Kano, Hideo; Ogata, Masaru; and Yukinaga, Hisajiro, 3,865,835.

Shirk, Gerrel L. Portable vehicle lift. 3,865,346, Cl. 254-89.00R.

Shlesinger, Bernard Edward, Jr.; and Mariner, Charlie D. Contact reed with foil-thin intermediate section. 3,866,007, Cl. 200-283.000.

Shoney, Suryakant R., to International Paper Company. Method of making a catheter. 3,865,666, Cl. 156-245.000.

Shope, Leslie A.: *See—*
Grissom, John T.; and Shope, Leslie A., 3,866,075.

Sicree, Albert J.; and Arnold, Fred E., to United States of America, Air Force. Benzothiophenedioxideisoquinoline polymers. 3,865,841, Cl. 260-78.0TF.

Siddall, John B.: *See—*
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Siebers, Gerardus Henricus Maria: *See—*
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Siegel, Stephen R.: *See—*
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Siekmann, Gunter: *See—*
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Siemens Aktiengesellschaft: *See—*
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Siemonsen, Hans Peter: *See—*
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Sieurin, Sven Ivan, to Granges Essen Aktiebolag. Device for metering molten metal to consumer stations. 3,865,282, Cl. 222-356.000.

Sihon, Tanas M., to General Motors Corporation. Diesel engine and cylinder head therefor. 3,865,087, Cl. 123-65.0VC.

Silano, Louis G.: *See—*
Hedefine, Alfred; and Silano, Louis G., 3,864,776.

Simmons, Walter H.; and Almilli, Saleh H., to Carrier Corporation. Refrigeration condenser unit. 3,865,517, Cl. 415-424.000.

Simon, James B.; and Bullock, Thomas B., to Giddings & Lewis, Inc. Position control system with plural signal transmission through common inductive device. 3,866,212, Cl. 340-347.0DA.

Simons, Charles William: *See—*
O'Neill, Gerald Joseph; Simons, Charles William; and Billings, Charles Alden, 3,865,950.

Simpson, George R., to American Optical Company. Optical systems and associated detecting means. 3,866,037, Cl. 250-216.000.

Sischka, Frederic J., to Memorex Corporation. Process for producing magnetic tape coating. 3,865,741, Cl. 252-62.540.

Sjerven, Gene A.: *See—*
Roden, John S.; Kirkevold, Kent A.; Tritle, Gary L.; and Sjerven, Gene A., 3,865,627.

Sjotun, Kyrre G., to Danfoss A/S. Fuel-oil pump for one and two line operation. 3,865,518, Cl. 417-440.000.

SKF Industrial Trading and Development Company N.V.: *See—*
Bratt, Axel Erland; Holst, Oscar Evert Ingemar; and Petre, James Gusten Ragnar, 3,865,497.
Hallerback, Stig Lennart, 3,866,071.

Slate, Douglas A. Method and apparatus for destringing tobacco. 3,865,257, Cl. 214-5.500.

Slaughter, Raymond Jeffrey. Optical guides. 3,865,466, Cl. 350-96.00B.

Slobodnik, Andrew J., Jr.; and Szabo, Thomas L., to United States of America, Air Force. Ultra low diffraction loss substrate members for acoustic surface wave devices. 3,866,153, Cl. 333-30.00R.

Small, Hamish, to Dow Chemical Company, The. Size separation of polydisperse suspensions by hydrodynamic chromatography. 3,865,717, Cl. 209-1.000.

Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich. Method of dehydrogenation, dehydrocyclization and hydrodealkylation. 3,865,891, Cl. 260-680.00R.

Smith, David A. Magnetic spark spreader. 3,866,074, Cl. 313-118.000.

Smith, Harry D., Jr., to Texaco Inc. Station measurements of earth formation thermal conductivity. 3,864,969, Cl. 73-154.000.

Smith, Harry M., to Purdue Research Foundation. Learner feedback device. 3,864,848, Cl. 35-9.00D.

Smith Industries Limited: *See*—
Embling, Clifford Arthur; Harrison, Alban; and Hawkes, Arthur Alfred, 3,866,220.

Smith, John A.: *See*—
Genese, Joseph N.; Rapoza, Edward J.; Galanaugh, Charles F.; Kennard, Harry M.; Chevalaz, Roger A.; and Smith, John A., 3,865,274.

Smith, Raymond E., Jr. Material handling method and apparatus. 3,865,262, Cl. 214-152.000.

Smith, Robert A., to General Electric Company. Room temperature vulcanizing silicone compositions. 3,865,759, Cl. 260-2.50B.

Smith, Timothy J. C., to Amchem Products, Inc. Cleaning composition. 3,865,756, Cl. 252-529.000.

Smith, Wilbur J.: *See*—
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SmithKline Corporation: *See*—
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Snyder, Richard H.: *See*—
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Societe Anonyme dite: L'Oreal: *See*—
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Kalopissis, Gregoire; and Vanlerberghe, Guy, 3,865,542.

Societe Anonyme Francaise du Ferodo: *See*—
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Societe Anonyme Poclain: *See*—
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Societe Anonyme Richier: *See*—
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Societe des Acieries du Manoir-Pompey: *See*—
Bellot, Jean; Hugo, Michel; Thuillier, Jacques; and Hubert, Roger, 3,865,639.

Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See*—
Thominet, Michel Leon, 3,865,946.

Societe Generale de Recherches et d'Applications Scientifiques"Sogeras": *See*—
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Societe Grenobloise d'Etudes et d'Applications Hydrauliques: *See*—
Condolios, Elie; and Essen, Uilke Van, 3,865,725.

Societe Italiana Telecomunicazion Siemens S.p.A.: *See*—
Verzocchi, Federico, 3,866,170.

Societe Nationale des Petroles d'Aquitaine: *See*—
Barbier, Maurice, 3,866,174.

Societe Nationale des Poudres et Explosifs: *See*—
Pollozec, Francois Ange, 3,865,808.

Soderstrom, Melvin Andrew: *See*—
Moser, Jessie Lee; Reavis, Robert Philmore, Jr.; and Soderstrom, Melvin Andrew, 3,865,980.

Soko Co., Ltd.: *See*—
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Sola Basic Industries, Inc.: *See*—
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Solbrig, Charles W.; Weil, Sanford A.; and Rosenberg, Robert B., to American Gas Association, Inc. Device and method for converting heat from fuel into visible light with changeable colors. 3,865,070, Cl. 116-63.00R.

Solid State Technology, Inc.: *See*—
DeGiorgio, John A.; Labib, Ahmed H.; and Rane, Subhash R., 3,866,206.

Solomons, Gerald L.: *See*—
Spicer, Arnold; and Solomons, Gerald L., 3,865,951.

Soraya, Sorayapour: *See*—
Mobius, Hans Eberhard; Kubini, Jakob; and Soraya, Sorayapour, 3,865,640.

Sosnowski, John, to Exxon Research and Engineering Company. Process for the selective hydrogenation of olefins. 3,865,716, Cl. 208-255.000.

Souffie, Robert David: *See*—
Burpulis, John Samuel; Souffie, Robert David; Counceller, John D.; and De Capite, Robert, 3,865,354.

Sowerby, Austen E., to Albright & Wilson Ltd. Sulphation of secondary alcohols. 3,865,861, Cl. 260-459.000.

Span-Fix (Proprietary) Limited: *See*—
Spath, Helmuth, 3,865,155.

Spath, Helmuth, to Span-Fix (Proprietary) Limited. Wire tensioning and tying tool means. 3,865,155, Cl. 140-123.500.

Specialty Papers Co., The: *See*—
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Speed Systems: *See*—
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Speelman, Irving A.: *See*—
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Spelthahn, Klaus: *See*—
Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, 3,865,913.

Spence, Harry E.; and Warden, Charles B., to Owens-Corning Fiberglas Corporation. Method and apparatus for gathering filaments into strands. 3,865,565, Cl. 65-2.000.

Spenchuk, Edward N.: *See*—
Mitchell, Stanley W.; and Spenchuk, Edward N., 3,865,405.

Sperling, Charles A., to Cross Newform Plastics Co., Inc. Tennis ball holder. 3,865,290, Cl. 224-5.00D.

Sperry Rand Corporation: *See*—
Crooke, Arthur W., 3,866,223.
Lonnemo, Kurt R., 3,865,514.
Palenchar, Daniel P.; Lenker, Wayne H.; and Lock, David P., 3,866,100.
Ross, Gerald F., 3,866,152.

Spicer, Arnold; and Solomons, Gerald L., to Ranks Hovis McDougall Limited. Production of edible protein from non-toxic strains of penicillium. 3,865,951, Cl. 426-60.000.

Spies, Harvey A., to Maryland Cup Corporation. Apparatus for transferring cylindrical articles and the like from a supply station to a work station. 3,865,272, Cl. 221-236.000.

Spietschka, Ernst; and Urban, Manfred, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Readily dispersible pigments. 3,865,605, Cl. 106-288.00Q.

Spindel-Motoren-und Maschinenfabrik A.G.: *See*—
Widmer, Dieter, 3,865,330.

Spitaels, Josef Margaretha Desideer, to International Standard Electric Corporation. Automatic telecommunication switching system. 3,865,999, Cl. 179-175.20R.

Spolana, narodni podnik: *See*—
Masat, Jan; Dohnalek, Rudolf; and Chvejka, Jiri, 3,865,553.

Spragg, Walter Thomas; and Seatonberry, Brian William, to Australian Atomic Energy Commission. Method and apparatus for measuring gas flow. 3,866,057, Cl. 250-303.000.

Sprague Electric Company: *See*—
Lapham, Jerome F., Jr.; and Mataya, John A., 3,864,817.
Marmorek, H. Stephen, 3,866,095.

Spransy, George B., to W. Braun Company. Dispensing cap for discharging liquid into flush tank from a bottle during a flushing cycle. 3,864,763, Cl. 4-227.000.

Sprecher & Schuh AG: *See*—
Amsler, Joachim, 3,866,005.

Spring Associates, Inc.: *See*—
Anonauer, Irwin, 3,864,765.

Spring Mills, Inc.: *See*—
Poole, Emory Donald, 3,865,151.

Springfield, Redwood L. Temperature measuring apparatus. 3,864,975, Cl. 73-341.000.

Square D Company: *See*—
Stanback, Harris I., 3,865,007.

Stach, Kurt: *See*—
Popelak, Alfred; Stach, Kurt; Thiel, Max; Schaumann, Wolfgang; and Stork, Harald, 3,865,838.

Stacy, John C.; Vetere, John J.; and Bennett, Sedgwick R., to GTE Sylvania Incorporated. Photoflash assembly with serially advancing percussive lamps. 3,866,033, Cl. 240-1.300.

Stafford, David F. Energy absorbing restraint for passengers. 3,865,433, Cl. 297-390.000.

Stafford, Eugene T., to Dixie Type and Supply Co. Apparatus for slitting sheet material. 3,865,000, Cl. 83-121.000.

Staheli, Paul: *See*—
Moser, Robert; and Staheli, Paul, 3,865,439.

Stalder, Eduard. Withdrawable cover for a swimming pool. 3,864,761, Cl. 4-172.140.

Stanback, Harris I., to Square D Company. Torque determining allen screw. 3,865,007, Cl. 85-61.000.

Standard Metallwerke GmbH: *See*—
Westhoff, Josef, 3,865,144.

Standard Oil Company: *See*—
Ridgway, John A., Jr.; Lappin, Terry A.; Benjamin, Benny Moses; Corns, Joseph B.; and Akin, Cavit, 3,865,691.
Steigelmann, Edward F.; and Hughes, Robert D., 3,865,890.

Stankus, Robert W., to Letot, Incorporated. Telephone control system having wakeup, message waiting, special message and fire alert modes. 3,865,985, Cl. 179-5.00P.

Stanley, William L.: *See*—
Jurd, Leonard; King, A. Douglas, Jr.; and Stanley, William L., 3,865,748.

Stanray Corporation: *See*—
Hassellof, Donald Elmer; and Scherer, Cyril George, 3,865,049.

Stantial, Charles T. Variable motion pedal assembly for a foot-powered vehicle. 3,865,366, Cl. 272-73.000.

Stark, John-Hermann; Lambiel, Jean-Claude; and Jungo, Markus, to Ciba-Geigy AG. Capillary viscosimeter. 3,864,962, Cl. 73-55.000.

Stauffer Chemical Company: *See*—
Baker, Don R., 3,865,944.
Fancher, LLewellyn W., 3,865,905.

Stauth, Tommy E. Rotary hydraulic motor. 3,865,524, Cl. 418-206.000.

Steeger, Elmer J.: *See*—
Elsner, Norbert E.; Perry, Louis W., Jr.; Emken, Michael R.; and Steeger, Elmer J., 3,865,632.

Steel, Francis R., to Motorola, Inc. Phase locked frequency divider circuitry. 3,866,137, Cl. 331-18.000.

Steen, George A. Monorail transportation system. 3,865,040, Cl. 104-18.000.

Steigelmann, Edward F.; and Hughes, Robert D., to Standard Oil Company. Process for separating a material from a mixture of mixture which comprises employing a solid water-insoluble, hydrophilic, semi permeable membrane. 3,865,890, Cl. 55-16.000.

Steinle, Georg: *See—*
Schieweck, Hubert; Steinle, Georg; and Haberl, Ludwig, 3,865,957.

Steinwart, Johannes; and Ruf, Max, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Piston for rotary piston machines and means for its manufacture. 3,865,179, Cl. 164-340.000.

Steljes, Bernadine E.: *See—*
Kellermeier, Robert J.; Knight, James T.; and Steljes, Bernadine E., 3,865,964.

Stelmach, Anthony L.: *See—*
Cartier, Jean-Pierre; Winn, David; and Stelmach, Anthony L., 3,866,019.

Stenberg, Joseph. Rotary engine. 3,865,085, Cl. 123-8.330.

Stephens, Ruth E., to Ethyl Corporation. Catalyst. 3,865,923, Cl. 423-213.200.

Stephens, Thomas M., to Envirotech Corporation. Automatic rotary sample injection valve. 3,864,978, Cl. 73-422.0GC.

Stern, Howard K.: *See—*
Di Matteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., 3,866,052.

Sterner, Robert A., to FMC Corporation. Anti-curl sheet feeding apparatus. 3,865,364, Cl. 271-105.000.

Stevens, Hugh D.: *See—*
Mitchell, Reid L.; Muller, Thomas E.; Stevens, Hugh D.; and Tabke, Robert S., 3,865,918.

Stich, Heinrich; Binder, Walter; Hutter, Josef; and Marecek, Helmut, to Osterreichische Stickstoffwerke Aktiengesellschaft. Process for the manufacture of cement clinker and sulphur dioxide. 3,865,602, Cl. 106-103.000.

Stiefel, Richard; and Krumm, Charles G., to Kahle Engineering Co. Automatic charge feeder. 3,865,297, Cl. 228-11.000.

Stierli, Robert F.: *See—*
Serafin, Frank G.; Previte, Robert W.; and Stierli, Robert F., 3,865,601.

Stock, Peter Sinclair: *See—*
Savage, Sidney Clifford; and Stock, Peter Sinclair, 3,864,942.

Stockel, Dieter: *See—*
Schneider, Friedrich; and Stockel, Dieter, 3,864,807.

Stockhaus, Klaus: *See—*
Merz, Herbert; Langbein, Adolf; Wick, Helmut; and Stockhaus, Klaus, 3,865,943.

Stoddard, Patrick C. Corona discharge treatment of an oil slick. 3,865,722, Cl. 210-42.000.

Stodt, Eberhard, to Lindemann Maschinenfabrik GmbH. Silo for bulk material. 3,865,259, Cl. 214-17.00C.

Stoka, Roberto: *See—*
Burgdorf, Jochen; and Stoka, Roberto, 3,865,215.

Stork, Harald: *See—*
Popelak, Alfred; Stach, Kurt; Thiel, Max; Schaumann, Wolfgang; and Stork, Harald, 3,865,838.

Stoveken, Robert Ernest: *See—*
De Howitt, Jack Renato; Jonkoff, Imre Mirko; and Stoveken, Robert Ernest, 3,865,078.

Stratco Metal Proprietary Limited: *See—*
Lasscock, Jack Edward, 3,864,882.

Strauss, Wennemar: *See—*
Immel, Waldemar; and Strauss, Wennemar, 3,865,702.

Strauts, Eric J.; Flaherty, John J.; and Lorenzi, Donald E., to Magnaflux Corporation. Eddy current testing system having probe switching and gating means. 3,866,116, Cl. 324-40.000.

Streets, Charles E.; and Hembree, Robert S. Charcoal starter device. 3,865,052, Cl. 110-1.00F.

Streitwieser, Andrew, Jr.: *See—*
Musser, Michael T.; and Streitwieser, Andrew, Jr., 3,865,865.

Stronge, David G.; and Ortiz, Remey. Water tight and moisture proof toilet paper container. 3,865,323, Cl. 242-55.530.

Studer, Philip A., to United States of America, National Aeronautics and Space Administration. Magnetic bearing. 3,865,442, Cl. 308-10.000.

Studinka, Josef: *See—*
Lussi, Heinz; Berther, Clau; and Studinka, Josef, 3,865,814.

Subsea Equipment Associates Ltd.: *See—*
Piotin, Maurice Joseph, 3,864,924.

Subsurface Machine and Manufacturing Inc.: *See—*
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Sueddeutsche Zucker-Aktiengesellschaft: *See—*
Schieweck, Hubert; Steinle, Georg; and Haberl, Ludwig, 3,865,957.

Suemune, Kenitiro: *See—*
Takahashi, Nobuyuki; Suemune, Kenitiro; Nagata, Shuji; and Tomozoe, Tatumi, 3,865,645.

Sugawara, Shinichi: *See—*
Arai, Mamoru; Itoh, Yashuhiro; Nakahara, Masaki; Kayamori, Hisashi; and Sugawara, Shinichi, 3,865,693.

Suggs, Robert. Platinum plating process. 3,865,697, Cl. 204-15.000.

Sully, Fenton F., to Everest & Jennings, Inc. Rotating wheelchair arm. 3,865,434, Cl. 297-417.000.

Sulzer Brothers Limited: *See—*
Demuth, Hans, 3,865,150.
de Vivy, Dominique le Febve, 3,866,026.
Konig, Ferdinand, 3,866,031.
Lorenz, Michael, 3,864,918.
Wolfgang, Brenner; Gunter, Feier; and Antonius, Vinnemann, 3,865,148.

Sumimato Chemical Company, Limited: *See—*
Yamamoto, Michihiro; Ishizumi, Kikuo; Mori, Kazuo; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 3,865,827.

Sumitomo Chemical Company, Limited: *See—*
Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, 3,865,866.

Sumitomo Metal Industries Limited: *See—*
Okuto, Koichiro; and Kai, Toshio, 3,865,498.

Summers, Peter: *See—*
Bendall, Dennis M.; Harris, William R.; Summers, Peter; Pyart, Raymond S.; Kew, Jeffrey; Sherborne, Michael C. D.; Caldwell, Alistair J.; Thorp, Peter M.; and Jones, John A., 3,865,482.

Summit Plastic Corporation: *See—*
Merzweiler, Leo A., 3,864,860.

Sun Oil Company of Pennsylvania: *See—*
Kirsch, Francis William; Barmby, David S.; and Potts, John D., 3,865,894.

Sun Research and Development Co.: *See—*
Duling, Irl N.; and Merges, John C., Jr., 3,865,674.

Sun Ventures Inc.: *See—*
Mitchell, Richard E., 3,865,889.

Sutton, Blaine M., to SmithKline Corporation. $\alpha,\beta$-Unsaturated esters of vulpinic acid. 3,865,947, Cl. 424-285.000.

Suwama, Toshitaka: *See—*
Ooue, Shingo; Ueda, Hiroyuki; Hashiue, Masakazu; Murakoshi, Makoto; Suwama, Toshitaka; and Noguchi, Masaru, 3,865,478.

Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, to Kobe Steel, Limited. Method of processing steel material having high austenitic grain-coarsening temperature. 3,865,636, Cl. 148-12.00R.

Suzuki, Kisaburo: *See—*
Oya, Seigo; Noro, Hiroo; and Suzuki, Kisaburo, 3,865,779.

Suzuki, Masao: *See—*
Hashimoto, Hiroshi; Abe, Tetsuo; and Suzuki, Masao, 3,866,102.

Suzuki, Yasoji, to Tokyo Shibaura Electric Co., Ltd. Logic circuit arrangement employing insulated gate field effect transistors. 3,866,186, Cl. 340-173.0SP.

Suzuki, Yasushi; and Itaya, Toshihisa. Tri-substituted aluminum salts or di-substituted aluminum salts of carboxyl group-containing, pharmaceutically effective compounds, and process for preparation thereof. 3,865,857, Cl. 260-448.00R.

Svehaug, Henry V.: *See—*
Davis, Walter L.; and Svehaug, Henry V., 3,865,965.

Svensson, Bengt; and Wallin, Gunnar, to Siemens Aktiengesellschaft. Heartbeat actuator with controlled pulse amplitude. 3,865,119, Cl. 128-419.00P.

Swanberg, Melvin E., to Xerox Corporation. Electrostatic control of fan fold paper stacking. 3,865,480, Cl. 355-3.00R.

Swanson, Allan R., to Clark Equipment Company. Two wheel tractor. 3,865,205, Cl. 180-12.000.

Sweeney, Robert. Arm braced and stabilized slingshot. 3,865,094, Cl. 124-20.00R.

Swered, Paul: *See—*
Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul, 3,865,724.

Swift & Company: *See—*
Anderson, Harry T., 3,865,711.
Connick, Francis Glenn, 3,865,351.
Lewis, Morton, 3,865,936.

Swisher, Rolla Douglas, to Berkley & Company, Inc. Flat butt tapered leader. 3,864,865, Cl. 43-44.980.

Sybertz, Hans, to Hambak Maschinenfabrik KG. Cutter for wood comminuting machine. 3,865,164, Cl. 144-230.000.

Sylvester, Robert T.: *See—*
Allen, Travis A.; and Sylvester, Robert T., 3,865,298.

Synek, Jan, to International Telephone and Telegraph Corporation. Trunk circuit with forced release feature. 3,865,993, Cl. 179-18.00F.

Syntex Corporation: *See—*
Edwards, John A.; and Fried, John H., 3,865,883.

Szabo Nee Czibula, Gabriella: *See—*
Korosi, Jeno; Szabo Nee Czibula, Gabriella; Lay Nee Konya; Erdelyi Nee Petocz, Lujza; Balla Nee Kosoczky, Bolya; and Kiszelly, Eniko, 3,865,828.

Szabo, Thomas L.: *See—*
Slobodnik, Andrew J., Jr.; and Szabo, Thomas L., 3,866,153.

Sze, Morgan C.: *See—*
Schindler, Harvey D.; Sze, Morgan C.; and Riegel, Herbert, 3,865,886.

Szymanski, Chester D.; and Helmstetter, Gerald J., to National Starch and Chemical Corporation. Modified starch-extended gelatin compositions. 3,865,603, Cl. 106-130.000.

T.A.D. Avanti, Inc.: *See—*
Darwood, James R., 3,865,986.

Tabke, Robert S.: *See—*
Mitchell, Reid L.; Muller, Thomas E.; Stevens, Hugh D.; and Tabke, Robert S., 3,865,918.

Taguchi, Seiichi; Tezuka, Sigeru; Tomotsu, Takeshi; and Mizuki, Eiichi, to Fuji Photo Film Co., Ltd. Multi-color dye-transfer apparatus. 3,865,033, Cl. 101-181.000.

Taguchi, Yasuo; and Shimonaka, Takehiro, to Tokyo Shibaura Electric Co., Ltd. Voltage regulator with protection circuit for an alternating current generator. 3,866,106, Cl. 320-64.000.

Tajima, Mutsunari; and Komatsu, Isao, to Nippon Electric Company, Limited. Specific frequency signal detecting circuit. 3,866,151, Cl. 333-17.000.

Takabatake, Hideo: *See—*
Takahashi, Kihei; and Takabatake, Hideo, 3,864,792.
Takada, Masami: *See—*
Nakamura, Shinichi; Morita, Kazuo; and Takada, Masami, 3,866,121.
Takahashi, Akinori: *See—*
Takahashi, Hikoji; Misawa, Seisuke; Takahashi, Akinori; and Yoshimura, Hisashi, 3,865,202.
Takahashi, Hikoji; Misawa, Seisuke; Takahashi, Akinori; and Yoshimura, Hisashi, to Nippon Kokuyu Tetsudo. Water jet drill bit. 3,865,202, Cl. 175-393.000.
Takahashi, Kihei; and Takabatake, Hideo, to Yoshida Kogyo Kabushiki Kaisha. Bridge top stop for slide fasteners. 3,864,792, Cl. 24-205.11R.
Takahashi, Nobuyuki; Suemune, Kenitiro; Nagata, Shuji; and Tomozoe, Tatumi, to Nippon Steel Corporation. Cold-rolled steel sheet for press-forming. 3,865,645, Cl. 148-142.000.
Takahashi, Toshio: *See—*
Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, 3,865,971.
Takasago Perfumery Co., Ltd.: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,865,888.
Sakuma, Sankichi, 3,865,532.
Takashima, Masaru, to Aikoh Co., Ltd. Composition for treating steels. 3,865,578, Cl. 75-58.000.
Takeda Chemical Industries, Ltd.: *See—*
Meguro, Kanji; and Kuwada, Yutaka, 3,865,811.
Takeuchi, Kiyokazu: *See—*
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Takezawa, Teruhiro: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.
Taltavull, Ignacio Goytisolo. Fluorescent fixture with optical device. 3,866,036, Cl. 240-51.11R.
Tanabe Seiyaku Co., Ltd.: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Sato, Tadashi; and Mori, Takao, 3,865,726.
Tanaka, Katsutoshi: *See—*
Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, 3,865,866.
Taneda, Teiichi: *See—*
Tatuoka, Sizuo; Taneda, Teiichi; and Aiko, Meiki, 3,865,465.
Tanney, John W., to Canadian Patents and Development Limited. Apparatus for measuring the velocity of a fluid stream relative to the apparatus. 3,864,971, Cl. 73-194.00R.
Tanus, Antonio. Theater chair automatically movable by remote control. 3,865,430, Cl. 297-217.000.
Tatuoka, Sizuo; Taneda, Teiichi; and Aiko, Meiki, to Nippon Hoso Kyokai. Compensation system for a polygonal mirror scanning system. 3,865,465, Cl. 350-7.000.
Tauern, Dankmar; Wild, Rainer; and Harder, Karl-Max, to Hilti Aktiengesellschaft. Method and apparatus for electrical stud welding. 3,866,012, Cl. 219-99.000.
Tautz, William Paul: *See—*
Beaman, Alden Gamaliel; and Tautz, William Paul, 3,865,823.
Taylor, Chandler R., Jr.: *See—*
Allen, Richard C.; and Taylor, Chandler R., Jr., 3,865,839.
Taylor, Francis A.: *See—*
Agusto, Robert G.; Taylor, Francis A.; and Briggs, Hartwell L., 3,865,884.
Taylor, Leland Thomas. Apparatus for the production of ozone. 3,865,733, Cl. 250-532.000.
Taylor, Sidney A., to United States of America, Navy. Synchro-to-digital converter. 3,866,214, Cl. 340-347.0SY.
Tazaki, Sadanori; and Ishida, Yozo, to Bridgestone Tire Company, Limited. Floating breakwater. 3,864,920, Cl. 61-5.000.
TDK Electronics Company Ltd.: *See—*
Ishino, Takeshi; and Ono, Nobuyuki, 3,866,009.
Technitrol, Inc.: *See—*
Cebula, Leonard A.; Fitzpatrick, Joseph F., Jr.; and Kershaw, Justin A., Jr., 3,866,126.
Teijin Limited: *See—*
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Yoshida, Norio; Imanaka, Yoshihiko; and Katayama, Kiyoji, 3,865,758.
Teledyne Aqua Tec Company: *See—*
Elkins, Christopher W.; and Ruehmann, Donald W., 3,865,310.
Teledyne Industries, Inc.: *See—*
Elkins, Christopher W.; and Ruehmann, Donald W., 3,865,310.
Tenneco Oil Company: *See—*
Wilson, David; and Burwell, Blair T., 3,865,541.
Terazono, Narihiro: *See—*
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Terhune, Ralph D.; and Duke, James C. Emulsion breaker. 3,865,732, Cl. 210-315.000.
Teruzzi, Angelo. Composable switch device. 3,866,008, Cl. 200-303.000.
Testa, Emilio: *See—*
Cavalleri, Bruno; Bellasio, Elvio; Testa, Emilio; and Maffii, Giulio, 3,865,847.
Tetenbaum, Marvin Theodore, to Allied Chemical Corporation. O-(n-methylthiocarbamoyl)-hexamethylenimine-2-oxime. 3,865,809, Cl. 260-239.0BF.
Tewksbury, John M., to Bendix Corporation, The. Single channel communication system. 3,866,230, Cl. 343-178.000.
Texaco Inc.: *See—*
Carlin, Joseph T.; and Cardenas, Richardo L., 3,865,187.
Christopher, Charles A.; and Allen, Joseph C., 3,865,190.
Haugen, Haakon; and Dadura, James G., 3,865,810.
McCoy, Frederic C.; and Cole, Edward L., 3,865,896.
Smith, Harry D., Jr., 3,864,969.
Waldbillig, James O., 3,865,739.
Texas Instruments Incorporated: *See—*
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Robichaud, Robert H., 3,865,099.
Textron, Inc.: *See—*
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Coles, Alan V., 3,865,332.
Massoney, Dwight F., 3,865,006.
Paxhia, Vincent B.; and Bossler, Franklin B., 3,865,311.
Tezuka, Sigeru: *See—*
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Thai, Ngo Hai; and Violi, Joseph, to Thomson-CSF. Waveguide junction circulator having conductive partition in magnetic midplane of function. 3,866,150, Cl. 333-1.100.
Thakore, Kaushik H., to Bendix Corporation, The. Energy tester for testing blasting machines that detonate electro-explosive devices. 3,865,028, Cl. 102-70.20R.
Thatcher, Judith G.; and White, Rudolph C. Conversion process utilizing homogeneous metal catalysts. 3,865,893, Cl. 260-683.200.
Thatcher, Russell S.: *See—*
Fiegel, Harry J., Jr.; and Thatcher, Russell S., 3,864,812.
Theriot, Harry P. Playing field with net and basket structure. 3,865,371, Cl. 273-95.00H.
Thevenaz, Jean; and Kreienbuhl, Claude, to Bolex International SA. Cinematographic apparatus. 3,865,476, Cl. 352-191.000.
Thiel, Max: *See—*
Popelak, Alfred; Stach, Kurt; Thiel, Max; Schaumann, Wolfgang; and Stork, Harald, 3,865,838.
Thiokol Chemical Corporation: *See—*
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Munson, William O.; and Reed, Russell, Jr., 3,865,035.
Thom, Wenzel W., to Architectural Art Mfg., Inc. Cover assembly for structural joints. 3,864,886, Cl. 52-469.000.
Thomas, Alfred R. Oscillating brush. 3,864,779, Cl. 15-22.00R.
Thomas, Arwyn Theophilus; and Williams, Raymond James. Manufacture of fuse heads. 3,865,008, Cl. 86-1.00R.
Thomas, Gordon A.: *See—*
Gleason, C. Roy; and Thomas, Gordon A., 3,865,684.
Thomas, Robert L. Stock market game. 3,865,380, Cl. 273-134.0AF.
Thominet, Michel Leon, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. Method of anesthetizing a mammal by administration of a substituted 2-arylalkyloxy benzamide. 3,865,946, Cl. 424-274.000.
Thompson, David F.: *See—*
Brenan, Robert R.; Bunker, Thomas D.; and Thompson, David F., 3,864,820.
Thompson, Frederick: *See—*
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Thompson, Garth Molesdale: *See—*
Eichler, David Anthony; Lucas, Joshua Michael Stuart; Martin, George Christopher James; Parnell, Edgar William; and Thompson, Garth Molesdale, 3,865,948.
Thompson, Hank A. Portable keg tapper. 3,865,276, Cl. 222-146.00C.
Thompson, William A., Jr. Bicycle hub. 3,865,220, Cl. 192-46.000.
Thomson-CSF: *See—*
Thai, Ngo Hai; and Violi, Joseph, 3,866,150.
Thomson, Ely Knox, to Continental Carbon Company. Filling spout assembly for solid materials. 3,865,280, Cl. 222-193.000.
Thorn, Lawrence B.: *See—*
Dreitzler, David R.; Moore, Charles R.; and Thorn, Lawrence B., 3,864,958.
Thorp, Peter M.: *See—*
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Thuillier, Jacques: *See—*
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Thuse, Erik: *See—*
Begun, Robert A.; Thuse, Erik; and McGee, Arthur L., 3,865,142.
Tichy, Dieter: *See—*
Schnee, Karl; Tichy, Dieter; and Engelhardt, Friedrich, 3,865,683.
Tidwell, Richard Wm. Spare tire holder. 3,865,291, Cl. 224-42.240.
TIE/Communications Inc.: *See—*
Kerman, Stephen; and Shinoi, Tsuyoshi, 3,865,995.
Timmins, Sidney, to Air-Log Limited. Control Linkages. 3,864,914, Cl. 60-434.000.
Tischer, Werner: *See—*
Liebert, Karl-Heinz; and Tischer, Werner, 3,865,211.
Tiss, Irving D. Collar stay. 3,865,286, Cl. 223-83.000.
Titus, Paul E.; and Di Gregorio, Joseph S., to Shell Oil Company. Preventing corrosion during the pipeline transportation of coal slurries. 3,865,547, Cl. 21-2.50R.

Tjurin, Vladimir Dmitrievich: *See—*
Nametkin, Nikolai Sergeevich; Gubin, Sergei Pavlovich; Tjurin, Vladimir Dmitrievich; Fedorov, Viktor Viktorovich; Usachev, Valery Zeilikovich; Matveev, Mikhail Semenovich; Larionov, Leonid Ivanovich; Eliner, Alexandr Solomonovich; and Barashkov, Ruslan Yakolevich, 3,865,715.

Tobolsky, Arthur V., deceased (by Tobolsky, Dorothy E., executrix). Process for preparing block copolymers with carbamate linkages between a polyvinyl chain and a polymer having active hydrogens. 3,865,898, Cl. 260-859.00R.

Tobolsky, Dorothy E., executrix: *See—*
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Todd, Charles E., to Uniroyal Inc. Expansible and contractible transfer ring. 3,865,669, Cl. 156-394.000.

Todd, Ronald Earl: *See—*
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Tokuyama Sekisui Kogyo Kabushiki Kaisha: *See—*
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Tokyo Shibaura Electric Co., Ltd.: *See—*
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Taguchi, Yasuo; and Shimonaka, Takehiro, 3,866,106.

Tolnai, Julius L., to Price Pfister Brass Mfg. Co. Appliance shutoff valve. 3,865,139, Cl. 137-625.190.

Tombu, Gerard. Wall covering assembly for heating coverings. 3,866,016, Cl. 219-213.000.

Tomotsu, Takeshi: *See—*
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Tomozoe, Tatumi: *See—*
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Okamoto, Miyoshi; Yoshida, Shusuke; Imai, Tadashi; Watanabe, Tatsuo; and Nishikaku, Shinzo, 3,865,678.

Tornqvist, Erik G. M.; and Cozewith, Charles, to Exxon Research and Engineering Company. Butadiene polymerization catalyst. 3,865,749, Cl. 252-429.00B.

Toromanoff, Edmond: *See—*
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Tosa, Tetsuya: *See—*
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Tottori, Hiroshi: *See—*
Kurahashi, Koichiro; Tottori, Hiroshi; and Isogai, Fumihiko, 3,866,084.

Towfigh, Keivan; and Ritchie, Douglas E., to Rangine Corporation. Shelving arrangement or the like. 3,865,337, Cl. 248-246.000.

Towne, Delbert Douglas: *See—*
Hardin, William Warner; Peterson, David Ernest; and Towne, Delbert Douglas, 3,865,365.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Shimizu, Syozo; Shinohara, Hiroshi; Kondou, Toshihito; and Yamada, Norimasa, 3,865,617.

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Tracy, Joseph Charles, Jr.: *See—*
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Traser, Werner: *See—*
Hebbel, Gerhard; Kruger, Horst; Traser, Werner; and Pfand, Herbert, 3,865,685.

Traverse, Robert F. Diaper and integral eversion container. 3,865,110, Cl. 128-284.000.

Treanor, Robert M.: *See—*
Augustin, Michael J.; Kramer, Wayne C.; and Treanor, Robert M., 3,866,136.

Trebinger, Karl: *See—*
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Trepka, Robert D.: *See—*
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Triebskorn, Bruno: *See—*
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Triggiani, Leonard V.: *See—*
Block, Jacob; Herbst, Richard J.; and Triggiani, Leonard V., 3,865,745.

Tritle, Gary L.: *See—*
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Troncoso, Fernando, Jr. Archery bow arrow rest. 3,865,096, Cl. 124-24.00R.

Troncoso, Fernando, Jr. Arrow locating device. 3,865,374, Cl. 273-106.50R.

Trost, Calvin E.: *See—*
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Trout, Mitchel A., to Dymo Industries Inc. Imprinter. 3,865,026, Cl. 101-45.000.

Truck Specialist Inc.: *See—*
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TRW Inc.: *See—*
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Tsao, Sherman H. M.: *See—*
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Tschumi, Otto, to Autophon Aktiengesellschaft. Indicator system with signal indicators. 3,866,216, Cl. 340-379.000.

Tsuiki, Takao; Hatsukano, Yoshikazu; and Nomiya, Kosei, to Hitachi, Ltd. Data control arrangement for a dynamic display system. 3,866,208, Cl. 340-324.00R.

Tsujimoto, Kayoshi, to Minolta Camera Co., Ltd. Photographic camera having a photosensitive element for measuring the light rays through the objective lens. 3,866,240, Cl. 354-24.000.

Tsuruta, Yasuo. Radiation tire. 3,865,169, Cl. 152-330.00C.

Tucci, John James, to AMP Incorporated. Apparatus for trimming conductors and inserting trimmed conductors into connecting devices. 3,864,802, Cl. 29-203.0MW.

Tully, Geoffrey R., Jr.: *See—*
Newbury, Ray S.; and Tully, Geoffrey R., Jr., 3,865,614.

Tums, Valdis M.; and Maxwell, Thomas J., to Union Carbide Corporation. Closure for shirred casing sticks. 3,865,954, Cl. 426-140.000.

Tupper, Burr E.; and Alva, Luis Cejudo, to Kaiser Gypsum Company, Inc. Apparatus and method for employing gypsum board as forms for poured concrete ceiling and floor structures. 3,864,888, Cl. 52-741.000.

Turk, Chester F.: *See—*
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Turkevich, Nikolai Mikhailovich; Olievskaya, Maria Stepanovna; Pashkevich, Julia Maximovna; Potopalsky, Anatoly Ivanovich; and Novitsky, Vasily Mikhailovich. Thiophosphamide derivatives of isoquinoline alkaloids, method of producing and application thereof. 3,865,830, Cl. 260-283.00P.

Turner, William R., to Automation Industries, Inc. Carrier beam sensor. 3,866,159, Cl. 340-3.00R.

Turzillo, Lee A. Impacted casing method for installing anchor piles or tiebacks in situ. 3,864,923, Cl. 61-53.600.

Tveter, Cora Belvin Judd, executrix: *See—*
Tveter, Elmer C., deceased; Harris, Guy H.; and Lindy, Lowell B., 3,865,718.

Tveter, Elmer C., deceased (by Tveter, Cora Belvin Judd, executrix); Harris, Guy H.; and Lindy, Lowell B., to Dow Chemical Company, The. Frothers for the flotation of sulfidic ores. 3,865,718, Cl. 209-166.000.

U.M.P. Plastics Ltd.: *See—*
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Uchibori, Kenichi: *See—*
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Ullman, John E., to Huntingdon Industries Incorporated. Bottle packaging machine and method. 3,864,890, Cl. 53-26.000.

Ulmer, Robert P.; and Holmen, James O., to Honeywell Inc. Plated wire memory element. 3,866,192, Cl. 340-174.0QA.

Umegae, Mamoru: *See—*
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Underwood, David W.; and Chestnut, Benjamin F., to P. R. Mallory & Co. Inc. Dual-function line switch for a cam-actuated timer switch. 3,866,002, Cl. 200-33.00R.

Unifilm Corporation: *See—*
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Union Camp Corporation: *See—*
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Union Carbide Corporation: *See—*
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United States Gypsum Company: *See—*
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
Buhler, George V.; and Havens, Dale E. Meter for use in detecting tension in straps having predetermined elastic characteristics. 3,864,953, Cl. 73-143.000.
Kazokas, George P. Vacuum leak detection. 3,864,960, Cl. 73-46.000.
Lindsey, Reed S., Jr. Random pulse generator. 3,866,128, Cl. 328-59.000.
Maserjian, Joseph. Deep trap, laser activated image converting system. 3,865,975, Cl. 178-7.100.
Perlman, Marvin; Rousey, William J.; and Messner, Alan. System for generating timing and control signals. 3,866,022, Cl. 235-92.0DM.

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Upchurch, Lewis E. Seal assembly for rotary engines. 3,865,521, Cl. 418-121.000.

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Usie, Raynold. Cane planter rake plate. 3,865,261, Cl. 214-83.260.

Ustav pro vyzkum rud: *See—*
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Utner, Ferdinand, to Siemens Aktiengesellschaft. Method of encapsulating end-contacted electrical components. 3,864,798, Cl. 29-25.420.

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Van Gelder, Josephus Ludovicus Hubertus; Raeymaekers, Alfons Herman Margaretha; Corneel, Roevens Leopold Frans; and Van Laerhoven, Willy Joannes, to Janssen Pharmaceutica N.V. Bicyclic imidazoles. 3,865,836, Cl. 260-309.600.

Van Gelder, Zeger; and Mattheij, Mathieu Martinus Maria Petrus, to U.S. Philips Corporation. Gas discharge panel and operating system. 3,866,090, Cl. 315-169.0TV.

Vanguard Industries, Inc.: *See—*
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Van Heijst, Willem Jan, to N.V. Industrieele Handelscombinatie Holland. Arrangement for anchoring a floating body. 3,865,064, Cl. 114-206.00R.

Van Laerhoven, Willy Joannes: *See—*
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Van Praag, Michel: *See—*
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Vastel, Jean, to Compagnie d'Applications Mecaniques a l'Electronique au Cinema et a l'Atomistique (C.A.M.E.C.A.). Microanalyser convertible into a mass spectrometer. 3,866,042, Cl. 250-296.000.

Veba-Chemie Aktiengesellschaft: *See—*
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Veeder Industries, Inc.: *See—*
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Veres, Raymond M. Runway illumination system. 3,866,032, Cl. 240-1.200.

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de Jonge, Frederik Ate; Druijvesteijn, Willem Frederik; Verhulst, Antonius Gerardus Hendrikus; and Enz, Ulrich Ernst, 3,866,190.

Verschuur, Eke. Oil/water pipeline inlet with oil supply via a large chamber. 3,865,136, Cl. 137-604.000.

Verzocchi, Federico, to Societe Italiana Telecomunicazion Siemens S.p.A. Binary transmission system using error-correcting code. 3,866,170, Cl. 340-146.1AL.

Vetere, John J.: *See*—
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Vickers Ruwolt Pty. Ltd.: *See*—
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Victor Comptometer Corporation: *See*—
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Vida, Julius A., to Kendall Company, The. Therapeutic compositions and method employing 1-morpholinomethyl-5-ethyl-5-phenyl barbituric acid or the hydrochloride salt thereof. 3,865,941, Cl. 424-248.000.

Vigneri, Guiseppe. Change speed gearing. 3,864,987, Cl. 74-354.000.

Villadsen, Vagn Hovgaard: *See*—
Jeding, Carl-Eric Christian; and Villadsen, Vagn Hovgaard, 3,864,934.

Violi, Joseph: *See*—
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Visser, Pieter; and Boom, Johannes, to Shell Oil Company. Partial combustion process soot pellets of increased strength and their preparation. 3,865,916, Cl. 264-85.000.

Vitelli, Vito J., to Morgan Construction Company. Metal treatment apparatus for steel rod having an oscillating platform below the laying head. 3,865,153, Cl. 140-2.000.

Vizziello, Vito M.; and Bouteiller, Charles A., to New England Log Homes, Inc. Grooving machine. 3,865,161, Cl. 144-136.00R.

Voelz, Frederick L., to Atlantic Richfield Company. Method for diagnosing malfunctions in internal combustion engines. 3,864,964, Cl. 73-116.000.

Voge, Richard Arnold: *See*—
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Volin, Timothy Earl; Benjamin, John Stanwood; Larson, Jay Michael; and Cairns, Robert Lacock, to International Nickel Company, Inc., The. Thermoplastic prealloyed powder. 3,865,575, Cl. 75-.50R.

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Volkswagonwerk Aktiengesellschaft: *See*—
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Von Alven, Raymond D., to Cutter Laboratories, Inc. Container support. 3,865,339, Cl. 248-318.000.

von Bose, Robert J.: *See*—
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Von Fummetti, Cyril William; and Dennis, David, to Deere & Company. Engine compartment access door latch system. 3,865,210, Cl. 180-69.00R.

Von Hippel, Hans Joachim, deceased (by Von Hippel, Sophie, heir and legal representative); and Von Hippel, Mila, heir and legal representative. Method of and system for gasifying underground deposits of coal. 3,865,186, Cl. 166-256.000.

Von Hippel, Mila, heir and legal representative: *See*—
Von Hippel, Hans Joachim, deceased; and Von Hippel, Mila, heir and legal representative, 3,865,186.

Von Hippel, Sophie, heir and legal representative: *See*—
Von Hippel, Hans Joachim, deceased; and Von Hippel, Mila, heir and legal representative, 3,865,186.

von Rintelen, Harald: *See*—
Gauss, Walter; Petersen, Siegfried; Ranz, Erwin; Himmelmann, Wolfgang; and von Rintelen, Harald, 3,865,594.

Von Thuna, Peter C., to Arthur D. Little, Inc. Retroreflecting beam splitter and apparatus for measuring gravity gradients embodying the same. 3,865,467, Cl. 350-102.000.

Voorhoeve, Rudolf Johannes: *See*—
Remeika, Joseph Peter; Voorhoeve, Rudolf Johannes; and Bell Telephone Laboratories, Incorporated, 3,865,752.

Vopat, Frank E.; and Colucci, Stephen L. Chalk eraser made from closed cell foam plastic. 3,864,778, Cl. 15-105.000.

Voronko, Vladimir Grigorievich: *See*—
Gulyaev, Gennady Ivanovich; Neznamov, Jury Nikolaevich; Nechiporenko, Anatoly Ionovich; Ostrenko, Viktor Yakovlevich; Kutsenko, Petr Ivanovich; Kurilenko, Viktor Kharitonovich; Ermolov, Ivan Vasilievich; Chekmarev, Alexandr Ilich; Voronko, Vladimir Grigorievich; Boiko, Ivan Petrovich; Mamontov, Vladimir Romanovich; Pustovoichenko, Jury Ivanovich; Volovik, Gennady Mikhailovich; Zakharenko, Vladislav Georgievich; and Paschenko, Viktor Prokhorovich, 3,864,951.

Vrijssen, Gerardus Arnoldus Herman Maria, to U.S. Philips Corporation. Vacuum-tight electric leadthrough in an electric discharge tube. 3,865,970, Cl. 174-50.530.

Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi: *See*—
Lev, Jaroslav; and Kakac, Karel, 3,865,147.

W. Braun Company: *See*—
Spransy, George B., 3,864,763.

W. R. Grace & Co.: *See*—
Block, Jacob; Herbst, Richard J.; and Triggiani, Leonard V., 3,865,745.
O'Neill, Gerald Joseph; Simons, Charles William; and Billings, Charles Alden, 3,865,950.
Serafin, Frank G.; Previte, Robert W.; and Stierli, Robert F., 3,865,601.

Wade, Robert C., to Resitron Corporation. Self-extinguishing resinous foams. 3,865,757, Cl. 260-2.5AR.

Wager Electric Corporation: *See*—
McGuirk, Francis A., Jr., 3,866,168.

Waghorne, Winfield Earle: *See*—
Parker, Alan James; Waghorne, Winfield Earle; Giles, Dion Ewing; Sharp, John Howard; Alexander, Robert; and Muir, David Michael, 3,865,744.

Wagner, Dieter, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Process for the manufacture of the pure isomers of naphthoylene-bis-benzimidazoles. 3,865,829, Cl. 260-282.000.

Wait, A. Logan, Jr. Outboard motor stand. 3,865,334, Cl. 248-4.000.

Wakida, Edward A.: *See*—
Shearer, Gerald W.; and Wakida, Edward A., 3,866,051.

Waldbillig, James O., to Texaco Inc. Thiadiazole derivatiive, mixture and compositions thereof. 3,865,739, Cl. 252-47.000.

Walker, Frank, to Hick, Hargreaves and Company Ltd. Methods of assembling tube supports. 3,864,811, Cl. 29-455.000.

Wallace, Eugene L. Truck bed tie-down anchoring device. 3,865,048, Cl. 105-369.00A.

Waller, Earl C., to Advance Transformer Co. Method of welding laminated cores. 3,866,014, Cl. 219-137.000.

Wallin, Gunnar: *See*—
Svensson, Bengt; and Wallin, Gunnar, 3,865,119.

Walser, Armin: *See*—
Fryer, Rodney Ian; and Walser, Armin, 3,865,815.

Walters, Patrick A.: *See*—
Abbott, Eugene A.; Isquith, Alan J.; and Walters, Patrick A., 3,865,728.

Wankel GmbH: *See*—
Steinwart, Johannes; and Ruf, Max, 3,865,179.

Warden, Charles B.: *See*—
Spence, Harry E.; and Warden, Charles B., 3,865,565.

Ware, J. Edgar, Jr.; Kilbourn, Edward E.; and Peardon, David L., to Rohm and Haas Company. Pyridyl phenyl carbamate rodenticides. 3,865,931, Cl. 424-84.000.

Warner, Paul F., to Phillips Petroleum Company. Method for reducing the sulfur content of a petroleum fraction. 3,865,714, Cl. 208-238.000.

Warren, Roy K., to Exxon Production Research Company. Method of mineral exploration by detecting electromagnetic energy at power line frequency. 3,866,111, Cl. 324-3.000.

Warren, William H. Vacuum control system. 3,865,420, Cl. 294-64.00R.

Washio, Takaji; and Aizawa, Tatsuo, to Mita Industrial Co. Ltd. Copying machine equipped with synchronous exposing mechanism. 3,865,481, Cl. 355-13.000.

Watanabe, Hiroshi, to Nippon Electric Company, Limited. Memory circuit. 3,866,188, Cl. 340-173.0DR.

Watanabe, Tatsuo: *See*—
Okamoto, Miyoshi; Yoshida, Shusuke; Imai, Tadashi; Watanabe, Tatsuo; and Nishikaku, Shinzo, 3,865,678.

Watkins, Jasper. Cleaning brush with revolving bristles. 3,864,780, Cl. 15-29.000.

Watkins, Jasper. Toy with automatically actuated speaker box. 3,864,873, Cl. 46-232.000.

Watkinson, Leonard James, to Howson-Algraphy Limited. Lithographic printing plates. 3,865,595, Cl. 96-87.00R.

Watson, James C.; and Hebert, Roy J., to Rockwell International Corporation. Tuning and matching of film inductors or transformers with paramagnetic and diamagnetic suspensions. 3,864,824, Cl. 29-608.000.

Watson, William E., to Allied Chemical Corporation. Method and apparatus for reacting sulfur dioxide and natural gas. 3,865,927, Cl. 423-570.000.

Way, Lee V. Auxiliary foldable step structure. 3,865,399, Cl. 280-166.000.

Wean United Inc.: *See*—
Ledebur, Harry C.; and Wilson, Harold R., 3,864,878.

Weber, Helmut: *See*—
Reinhardt, Helmut; Trebinger, Karl; Kallrath, Gottfried; and Weber, Helmut, 3,865,921.

Webers, Werner: *See*—
Neier, Wilhelm; Lindstadt, Hans-Jurgen; and Webers, Werner, 3,865,606.

Wegman, Jerry Wayne, Sr.: *See—*
Allen, Herbert J., Jr.; Todd, Ronald Earl; and Wegman, Jerry Wayne, Sr., 3,865,623.

Wehling, Rolf; and Neubert, Rolf, to Fried. Krupp, Gesellschaft mit beschrankter Haftung. Apparatus and method for spinning yarns composed of fiber blends. 3,864,902, Cl. 57-58.950.

Weigand, John R.: *See—*
Wiegand, John Richard, 3,866,193.

Weigt, Paul, to Flachglas Aktiengesellschaft Delog-Detag. Automotive-vehicle windshield with built-in active-antenna system. 3,866,232, Cl. 343-713.000.

Weil-McLain Co., Inc.: *See—*
Deters, Elmer M., 3,865,512.

Weil, Sanford A.: *See—*
Solbrig, Charles W.; Weil, Sanford A.; and Rosenberg, Robert B., 3,865,070.

Weimer, Paul Kessler, to RCA Corporation. Charge-transfer display system. 3,866,209, Cl. 340-324.00R.

Weiser, Earnest Franklin, to General Electric Company. Electrical motor drive system with field control operable in motoring and braking modes. 3,866,098, Cl. 318-251.000.

Weiss, Erwin M.; and Brander, Richard, to Beltone Electronics Corporation. Ear seal. 3,865,998, Cl. 179-107.00E.

Weissman, Bernard. Abrading tool and holder therefor. 3,864,884, Cl. 51-358.000.

Weitz, Hans-Martin; and Schwarz, Helmut. Manufacture of polymers of cycloolefins by ring-opening polymerization of cycloolefins. 3,865,800, Cl. 260-93.100.

Welch, James P.; and Siegel, Stephen R., to Odetics, Inc. Clock signal assurance in digital data communication systems. 3,865,981, Cl. 178-69.500.

Wellcome Foundation Limited, The: *See—*
Riley, Clifford, 3,865,549.

Wells, Thomas R.: *See—*
Clever, Raymond E.; Hapke, Kenyon A.; and Wells, Thomas R., 3,865,331.

Wells, Victor S.: *See—*
Clark, Hal J.; and Wells, Victor S., 3,865,214.

Welmecke, August Philip, to Crocker Country Day School, Inc. Teaching aid. 3,864,850, Cl. 35-31.00R.

Welty, Donald R.: *See—*
Moore, Lawrence A.; and Welty, Donald R., 3,865,531.

Wen, Samuel S.; and Nelson, Donald J., to Burroughs Corporation. Overlap timing control circuit for conditioning signals in a semiconductor memory. 3,866,061, Cl. 307-208.000.

Wenckus, Joseph F.; Castonguay, Roger A.; Hanfly, Bernard C.; and Mallahan, Francis J., to Arthur D. Little, Inc. Pressure-and temperature-controlled apparatus for large-scale production of crystals by the czochralski technique. 3,865,554, Cl. 23-273.0SP.

Wernick, Jack Harry: *See—*
Andres, Klaus; Bucher, Ernest; and Wernick, Jack Harry, 3,865,557.

West, Emery L.: *See—*
Roller, William G.; and West, Emery L., 3,865,335.

West, John Barth, to Maryland Cup Corporation. Automatic container capping and lid dispensing device. 3,864,898, Cl. 53-328.000.

Western Electric Company, Incorporated: *See—*
Broyde, Barret, 3,865,597.

Westhoff, Josef, to Standard Metallwerke GmbH. Spacer for double windows. 3,865,144, Cl. 138-103.000.

Westinghouse Air Brake Company: *See—*
Bridigum, Robert J.; and Nebiolo, Renaldo A., 3,865,252.

Westinghouse Electric Corporation: *See—*
Buck, Daniel C., 3,866,225.
Mann, August C.; and Dillman, Thayer L., 3,866,196.
Moore, Robert A., 3,866,154.
Reed, Terry J.; and Reuther, John F., 3,866,109.
Yannone, Robert A.; and Kiscaden, Roy W., 3,866,108.

Westram, Werner, to Siemens Aktiengesellschaft. Pushbutton switch with reciprocating cam. 3,866,006, Cl. 200-153.0LA.

Westvaco Corporation: *See—*
Falkehag, Sten I., 3,865,803.

Whalley, Frank M.: *See—*
Deprez, Thomas A.; and Whalley, Frank M., 3,865,533.

Wheelabrator-Frye, Inc.: *See—*
Diehn, Philip H., 3,864,876.

Wheeler, Randall P.: *See—*
Brudi, Ronald A.; Matthewson, Randall W.; and Wheeler, Randall P., 3,865,265.

Whirlpool Corporation: *See—*
Winterheimer, Sylvester A., 3,865,448.

White, James C.: *See—*
Hunsinger, Peter; and White, James C., 3,865,288.

White, Philip Henry. Multiple spindle machine with variable speed drive. 3,864,994, Cl. 82-3.000.

White, Robert Miles; and Bates, Howard John, to Rucker Company, The. Tension mooring device. 3,865,066, Cl. 114-230.000.

White, Rudolph C.: *See—*
Thatcher, Judith G.; and White, Rudolph C., 3,865,893.

White, William Harold: *See—*
Gregory, Charles Roy; and White, William Harold, 3,866,064.

Whitfield, Douglas, to Canada, Atomic Energy of, Limited. Remotely controlled brachytherapy unit. 3,866,050, Cl. 250-497.000.

Wick, Helmut: *See—*
Merz, Herbert; Langbein, Adolf; Wick, Helmut; and Stockhaus, Klaus, 3,865,943.

Wick, Richard G.; and Bennett, Henry J., to Burdett Manufacturing Company. Finishing line heat recovery. 3,865,076, Cl. 118-66.000.

Widmer, Dieter, to Spindel-Motoren-und Maschinenfabrik A.G. Bobbin spindle. 3,865,330, Cl. 242-130.000.

Wiegand, Charles W. Pilot operated relief valve. 3,865,132, Cl. 137-492.500.

Wiegand, John Richard, to Velinsky, Milton; and Weigand, John R., part interest to each. Asymetric bistable magnetic device. 3,866,193, Cl. 340-174.0ZB.

Wiegmann, William: *See—*
Logan, Ralph Andre; Schwartz, Bertram; Tracy, Joseph Charles, Jr.; and Wiegmann, William, 3,865,646.

Wieschel, John E.; Zanzig, Jerald G.; and Petrykowski, Thomas F., to Heil Co., The. Refuse body with two-part packer-ejector platen. 3,865,260, Cl. 214-82.000.

Wiggins Teape Research & Development Limited: *See—*
Ross, John Edward; Marshall, David James; and Chapman, Brian Samuel, 3,865,613.

Wilcox, Howard A.: *See—*
Higbee, Wallace C.; Wilcox, Howard A.; and Jensen, Jay W., 3,865,329.

Wild, Rainer: *See—*
Tauern, Dankmar; Wild, Rainer; and Harder, Karl-Max, 3,866,012.

Wilde, Peter Van Dyke, to Bell Telephone Laboratories, Incorporated. Interconnection of electrical devices. 3,865,624, Cl. 117-212.000.

Wildt Mellor Bromley Limited: *See—*
Savage, Sidney Clifford; and Stock, Peter Sinclair, 3,864,942.

Wilke, Raud A., to Koehring Company. Oil sealing device. 3,865,386, Cl. 277-187.000.

Willette, E. Leon, to Amdahl Corporation. Having an instruction pipeline for concurrently processing a plurality of instructions. 3,866,180, Cl. 340-172.500.

Williams, John. Cutting tool. 3,864,829, Cl. 30-130.000.

Williams, John: *See—*
Baker, Francis Sidney; Harrison, Charles Richard; Osborn, Anthony Raymond; and Williams, John, 3,866,077.

Williams, Olin E., to Koppers Company, Inc. Method and apparatus for the production of steel. 3,865,579, Cl. 75-60.000.

Williams, Raymond James: *See—*
Thomas, Arwyn Theophilus; and Williams, Raymond James, 3,865,008.

Williams, Richard E., to Scope Incorporated. Digital log-time generator. 3,866,024, Cl. 235-92.0CC.

Willis Brothers, Inc.: *See—*
Willis, Elmer D., 3,864,788.

Willis, Elmer D., to Willis Brothers, Inc. Scallop spreading machine. 3,864,788, Cl. 17-53.000.

Wilson, Albert, to Litton Systems, Inc. Releasable connection for intersecting members. 3,865,720, Cl. 209-405.000.

Wilson, David; and Burwell, Blair T., to Tenneco Oil Company. Method for processing colemanite ore. 3,865,541, Cl. 432-13.000.

Wilson, Harold R.: *See—*
Ledebur, Harry C.; and Wilson, Harold R., 3,864,878.

Winberg, Douglas F., to Subsurface Machine and Manufacturing Inc. Tunneling machine having access passageway and invert cleaner. 3,865,196, Cl. 172-802.000.

Wingler, Frank; Muller, Richard; and Pollheide, Dieter, to Bayer Aktiengesellschaft. Additives for powder resins. 3,865,904, Cl. 260-901.000.

Winn, David: *See—*
Cartier, Jean-Pierre; Winn, David; and Stelmach, Anthony L., 3,866,019.

Winterbottom, Kenneth: *See—*
Dobinson, Bryan; and Winterbottom, Kenneth, 3,865,621.

Winterheimer, Sylvester A., to Whirlpool Corporation. Shelf retainer. 3,865,448, Cl. 312-311.000.

Wirotama, I. Poetoe Gde: *See—*
Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, 3,865,952.

Wirth, Pierre Charles, to Societe Generale de Recherches et d'Applications Scientifiques"Sogeras". Method of increasing cerebral blood flow. 3,865,942, Cl. 424-259.000.

Withrow, Robert B., to American La France Inc. Reuseable pressurized dispenser. 3,865,158, Cl. 141-19.000.

Wittenwyler, Clifford V., to Shell Oil Company. Curing of polyepoxide based foundry cores with a curing agent containing a liquid hydrocarbon and a boron trifluoride complex. 3,865,777, Cl. 260-37.0EP.

Wojcik, Walter J., to International Business Machines Corporation. Alignment illumination system. 3,865,483, Cl. 355-43.000.

Wolf, Clarence P. Blowout panel system for building walls. 3,864,881, Cl. 52-1.000.

Wolf, Lloyd J. Directional guide for power hand drill. 3,864,839, Cl. 33-334.000.

Wolf, Rainer: *See—*
Riedel, Manfred; and Wolf, Rainer, 3,865,604.

Wolf, Tobin. Helicopter toy. 3,864,868, Cl. 46-1.00H.

Wolf, William Edward, to du Pont de Nemours, E. I., and Company. Defect size discriminator circuit for web inspection system. 3,866,054, Cl. 250-562.000.

Wolfgang, Brenner; Gunter, Feier; and Antonius, Vinnemann, to Sulzer Brothers Limited. Jacquard machine. 3,865,148, Cl. 139-59.000.

Woll, Toni. Expandable crash-restraining means. 3,865,398, Cl. 280-150.0AB.

Woodbridge, David D., to McMillin Investments, Inc. Irradiator apparatus. 3,865,734, Cl. 250-432.000.

Woodiwiss, Charles R.: *See—*
Norris, Russell; and Woodiwiss, Charles R., 3,865,754.

Wooley, Bruce Allen: *See—*
Baugh, Charles Richmond; and Wooley, Bruce Allen, 3,866,030.

World-Wide Paper Reclamation, Inc.: *See—*
Gleason, C. Roy; and Thomas, Gordon A., 3,865,684.

Worthington-CEI, Incorporated: *See—*
Mastaj, Joseph A., 3,865,013.

Wossner, Felix, to Fichtel & Sachs AG. Hydraulic shock absorber. 3,865,356, Cl. 267-139.000.

Wray, William R.: *See—*
Hardy, Herbert L.; Murray, Joseph E., Jr.; and Wray, William R., 3,865,475.

Wright, David M.: *See—*
Dean, Carl J.; and Wright, David M., 3,865,445.

Wright, Edward S.; and Angstadt, John W., to Blaw-Knox Food and Chemical Equipment, Inc. An apparatus for washing particulate comestible materials. 3,865,563, Cl. 55-257.000.

Wright Machinery Company, Inc.: *See—*
Petrea, James C., 3,864,895.

Wucherpfennig, Karl; and Wysocki, Guenter. Stabilization of tartar in wine, grape must, or grape juice. 3,865,960, Cl. 426-239.000.

Wucherpfennig, Karl; and Wysocki, Guenter. Electrodialyzing wine to remove sulfur-containing compounds. 3,865,961, Cl. 426-239.000.

Wunder, Friedrich: *See—*
Ferholz, Hans; Schmidt, Hans-Joachim; and Wunder, Friedrich, 3,865,872.

Wunner, Roland, to Liba Maschinenfabrik GmbH. Warp knitting or raschel machine. 3,864,943, Cl. 66-84.00A.

Wycoff, Keith H. Communication system incorporating signal delay. 3,866,124, Cl. 325-55.000.

Wyhof, John R., to ICI United States Inc. Dielectric polyester resins from a blend of ethoxylated bis phenols. 3,865,789, Cl. 260-47.00C.

Wyhof, John R.: *See—*
Kuehn, Erich; and Wyhof, John R., 3,865,869.

Wysocki, Guenter: *See—*
Wucherpfennig, Karl; and Wysocki, Guenter, 3,865,960.
Wucherpfennig, Karl; and Wysocki, Guenter, 3,865,961.

Xerox Corporation: *See—*
Charland, Terrence D.; and Klett, Stanley D., 3,865,081.
Goffe, William L., 3,866,236.
Hudson, Frederick W., 3,865,080.
McCrobie, George L.; and Donnel, Roscoe J., 3,865,470.
McCrobie, George L., 3,865,471.
Radler, Richard W., Jr.; Millonzi, Richard P.; and Bergfjord, John A., 3,865,798.
Sato, Masamichi; and Fukushima, Osamu, 3,865,611.
Shearer, Gerald W.; and Wakida, Edward A., 3,866,051.
Swanberg, Melvin E., 3,865,480.
Valentine, Charles G., 3,864,849.

Yakich, Sam Savo. Hip joint bearing prosthesis. 3,864,758, Cl. 3-1.000.

Yamada, Hiroshi; and Yoshioka, Yoshiro, to Fujitsu Limited. System for transferring information between memory banks. 3,866,182, Cl. 340-172.500.

Yamada, Norimasa: *See—*
Shimizu, Syozo; Shinohara, Hiroshi; Kondou, Toshihito; and Yamada, Norimasa, 3,865,617.

Yamaha International Corporation: *See—*
Zenser, Darwin, 3,865,402.

Yamaki, Kiyoshi: *See—*
Kawai, Yoshio; Asano, Kiro; and Yamaki, Kiyoshi, 3,865,713.

Yamamoto, Hisao: *See—*
Yamamoto, Michihiro; Ishizumi, Kikuo; Mori, Kazuo; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 3,865,827.

Yamamoto, Keisuke: *See—*
Kawamata, Yukio; Yamamoto, Keisuke; and Mouri, Hiroshi, 3,866,177.

Yamamoto, Kozo; and Shinohara, Isao, to Matsushita Electric Industrial Co., Ltd. Automatic telephone answering system with variable speed drive control. 3,865,987, Cl. 179-6.00R.

Yamamoto, Michihiro; Ishizumi, Kikuo; Mori, Kazuo; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, to Sumimato Chemical Company, Limited. Process for producing quanazolinone derivatives. 3,865,827, Cl. 260-251.0QA.

Yamamoto, Sigeo: *See—*
Ozaki, Toshiaki; Kamoshita, Katsuzo; Tanaka, Katsutoshi; Yamamoto, Sigeo; Ooishi, Tadashi; Nakai, Shinji; and Akiba, Keiichiro, 3,865,866.

Yamamoto, Taro: *See—*
Mori, Keijiro; Indo, Masahiro; and Yamamoto, Taro, 3,865,181.

Yamane, Hisakichi: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.

Yamauchi, Goro: *See—*
Kumagai, Denroku; Marubayashi, Gen; Arita, Kishio; Kubo, Shugo; Yamauchi, Goro; Takahashi, Toshio; and Sato, Toshihiko, 3,865,971.

Yanagimachi, Akio: *See—*
Masuda, Michio; Mohri, Katsuo; Nabeyama, Hiroaki; Takezawa, Teruhiro; Yamane, Hisakichi; Sawabe, Eiichi; Yanagimachi, Akio; Uehara, Takashi; and Yoshino, Takehiko, 3,865,973.

Yannone, Robert A.; and Kiscaden, Roy W., to Westinghouse Electric Corporation. Control system and method for controlling dual fuel operation of industrial gas turbine power plants, preferably employing a digital computer. 3,866,108, Cl. 322-14.000.

Yeh, William C. T.: *See—*
Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., 3,865,583.
Kline, James D.; Yeh, William C. T.; and Preston, Ulysses A., 3,865,584.

Yevick, George J., to Personal Communications Inc. Cylindrical lens bonded microfiche. 3,865,485, Cl. 355-46.000.

Yhtyneet Paperitehtaat Oy Jylhavaara: *See—*
Salminen, Rauno, 3,865,243.

Yi Cho, Alfred; and Reinhart, Franz Karl, to Bell Telephone Laboratories, Incorporated. Molecular beam epitaxy shadowing technique for fabricating dielectric optical waveguides. 3,865,625, Cl. 117-212.000.

Ying, Robert S., to Hughes Aircraft Company. Method for fabricating semiconductor devices. 3,864,819, Cl. 29-583.000.

Yokagawa Electric Works, Ltd.: *See—*
Maezawa, Keizo; and Ohta, Susumu, 3,866,103.

Yokoyama, Kanji; and Matsuo, Hiroyuki, to Hitachi, Ltd. Channel selecting apparatus for television receiver having means to cut off amplifying transistor for predetermined time. 3,866,112, Cl. 334-15.000.

Yonei, Mineko: *See—*
Kazama, Ken; Ohno, Kunio; Umegae, Mamoru; and Yonei, Mineko, 3,865,284.

Yorke, Daniel F.: *See—*
Moorman, Charles J.; Reuter, Frederick A.; Yorke, Daniel F.; and Meyer, Martin R., 3,866,173.

Yoshida, Kazuaki: *See—*
Horie, Toshio; Yoshida, Kazuaki; Hori, Hisako; and Katsuyama, Yoshihisa, 3,865,871.

Yoshida Kogyo Kabushiki Kaisha: *See—*
Matsuda, Yoshio, 3,864,946.
Takahashi, Kihei; and Takabatake, Hideo, 3,864,792.

Yoshida, Kohji. Disc record player. 3,865,384, Cl. 274-23.00R.

Yoshida, Norio; Imanaka, Yoshihiko; and Katayama, Kiyoji, to Teijin Limited. Polyurethane foam filter material containing adsorbent and method of production thereof. 3,865,758, Cl. 260-2.5AK.

Yoshida, Shusuke: *See—*
Okamoto, Miyoshi; Yoshida, Shusuke; Imai, Tadashi; Watanabe, Tatsuo; and Nishikaku, Shinzo, 3,865,678.

Yoshida, Takashi: *See—*
Matsumoto, Tadashi; and Yoshida, Takashi, 3,866,015.

Yoshida, Yoshinobu, to Fuji Photo Film Co., Ltd. Photographic film unit for a photographic diffusion transfer color process containing coupler-developers. 3,865,593, Cl. 96-77.000.

Yoshihide Fujimoto: *See—*
Horiuchi, Akira, 3,864,759.

Yoshimura, Hisashi: *See—*
Takahashi, Hikoji; Misawa, Seisuke; Takahashi, Akinori; and Yoshimura, Hisashi, 3,865,202.

Yoshinago, Fumihiro: *See—*
Okumura, Shinji; Yoshinago, Fumihiro; Kubota, Koji; and Kamijo, Hirotaka, 3,865,690.

Yoshino, Takao, to Kabushiki Kaisha Komatsu Seisakusho. Marine propeller. 3,865,510, Cl. 416-134.000.

Yoshino, Takehiko: *See—*
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# LIST OF REISSUE PATENTEES

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423 3,865,004

**CLASS 85**
44 3,865,006
61 3,865,007

**CLASS 86**
1R 3,865,008

**CLASS 89**
1.815 3,865,009

**CLASS 90**
4 3,865,010
13.05 3,865,011
24F 3,865,012

**CLASS 91**
411R 3,865,013
417 3,865,014

**CLASS 92**
78 3,865,015

**CLASS 93**
1C 3,865,016
1E 3,865,017
8WA 3,865,018
35R 3,865,019
36A 3,865,020

**CLASS 96**
1PC 3,865,587
33 3,865,588
35.1 3,865,589
38 3,865,590
66.3 3,865,591
76R 3,865,592
77 3,865,593
84R 3,865,594
87R 3,865,595
108 3,865,596
115R 3,865,597
125 3,865,598

**CLASS 98**
40C 3,865,021
115K 3,865,022

**CLASS 99**
495 3,865,023
645 3,865,024

**CLASS 100**
26 3,865,025

**CLASS 101**
45 3,865,026
93.14 3,865,029
93.22 3,865,030
114 3,865,031
129 3,865,032
181 3,865,033

**CLASS 102**
7.2 3,865,034
64 3,865,027
66 3,865,035
67 3,865,036
70.2R 3,865,028
3,865,037
92.7 3,865,038

**CLASS 104**
18 3,865,039
3,865,040
20 3,865,041
26B 3,865,042
148MS 3,865,043
197 3,865,044

**CLASS 105**
199C 3,865,045
253 3,865,046
366D 3,865,047
376 3,865,049
484 3,865,048

**CLASS 106**
65 3,865,599
84 3,865,600
95 3,865,601
103 3,865,602
130 3,865,603
168 3,865,604
271 3,865,606
288Q 3,865,605

**CLASS 108**
19 3,865,050
132 3,865,051

**CLASS 110**
1F 3,865,052
7A 3,865,053
8C 3,865,054

**CLASS 111**
4 3,865,055
7 3,865,056
3,865,057

**CLASS 112**
63 3,865,058
79R 3,865,059

**CLASS 114**
.5R Re.28,332
16R 3,865,060
39 3,865,061
43.5 3,865,062
144R 3,865,063
206R 3,865,064
210 3,865,065
230 3,865,066

**CLASS 115**
12R 3,865,067
34R 3,865,068

**CLASS 116**
4 3,865,069
63R 3,865,070
129 3,865,071

**CLASS 117**
1.7 3,865,607
5.3 3,865,608
17 3,865,610
17.5 3,865,609
3,865,611
3,865,612
36.8 3,865,613
46CA 3,865,614
47A 3,865,615
132BF 3,865,616
132C 3,865,617
136 3,865,618
138.8 3,865,619
140A 3,865,620
141 3,865,621
161UT 3,865,622
212 3,865,623
3,865,624
3,865,625
226 3,865,626
240 3,865,627

**CLASS 118**
4 3,865,072
8 3,865,073
49.5 3,865,074
50 3,865,075
66 3,865,076
250 3,865,077
612 3,865,078
621 3,865,079
637 3,865,080
3,865,081

**CLASS 119**
17 3,865,082

**CLASS 122**
235B 3,865,084
235R 3,865,083

**CLASS 123**
8.33 3,865,085
8.45 3,865,086
44D 3,865,093
65VC 3,865,087
90.12 3,865,088
117R 3,865,089
139AZ 3,865,090
139ST 3,865,091
146.5A Re.28,333
148E 3,865,092
196CP 3,865,213

**CLASS 124**
20R 3,865,094
24R 3,865,095
3,865,096

**CLASS 126**
197 3,865,097
271.2A 3,865,098

**CLASS 128**
2.05D 3,865,100
2.06R 3,865,101
2.1E 3,865,099
64 3,865,102
3,865,103
66 3,865,104
69 3,865,105
145.8 3,865,106
222 3,865,107
260 3,865,108
283 3,865,109
284 3,865,110
287 3,865,111
290R 3,865,112
303.1 3,865,113
3,865,114
359 3,865,115
400 3,865,116
403 3,865,117
404 3,865,118
419P 3,865,119

**CLASS 131**
140C 3,865,120
261B 3,865,121

**CLASS 132**
73 3,865,122

**CLASS 134**
2 3,865,628
19 3,865,629

**CLASS 135**
4R 3,865,123

**CLASS 136**
86A 3,865,630
114 3,865,631
237 3,865,632

**CLASS 137**
13 3,865,124
51 3,865,125
101.21 3,865,126
115 3,865,127
220 3,865,128
315 3,865,129
360 Re.28,334
385 3,865,130
432 3,865,131
492.5 3,865,132
512 3,865,133
594 3,865,134
596.14 3,865,135
604 3,865,136
613 3,865,137
624.12 3,865,138
625.19 3,865,139
625.64 3,865,140
629 3,865,141
635 3,865,142
826 3,865,143

**CLASS 138**
103 3,865,144
113 3,865,145
154 3,865,146

**CLASS 139**
1E 3,865,147
59 3,865,148
122R 3,865,149
185 3,865,150
304 3,865,151

**CLASS 140**
1 3,865,152
2 3,865,153
109 3,865,154
123.5 3,865,155
123.6 3,865,156

**CLASS 141**
7 3,865,157
19 3,865,158
67 3,865,159

**CLASS 144**
3D 3,865,160
136R 3,865,161
144R 3,865,162
193A 3,865,163
230 3,865,164

**CLASS 148**
1.5 3,865,633
6.35 3,865,634
11.5F 3,865,635
12R 3,865,636
12.1 3,865,637
3,865,638
12.9 3,865,640
23 3,865,641
28 3,865,642
36 3,865,643
37 3,865,644
127 3,865,639
142 3,865,645
171 3,865,646
175 3,865,647
3,865,648
187 3,865,649
3,865,650
3,865,651
3,865,652
3,865,653
3,865,654
189 3,865,655

**CLASS 149**
7 3,865,656
19.3 3,865,657
3,865,658
19.4 3,865,659
35 3,865,660

**CLASS 150**
1 3,865,165
52R 3,865,166

**CLASS 152**
212 3,865,167
213A 3,865,168
330C 3,865,169
386 3,865,170

**CLASS 156**
79 3,865,661
94 3,865,662
116 3,865,663
192 3,865,664
244 3,865,665
245 3,865,666
264 3,865,681
285 3,865,667
291 3,865,668
394 3,865,669
3,865,670
488 3,865,671

**CLASS 157**
1.24 3,865,171
1.26 3,865,172

**CLASS 159**
47R 3,865,672

**CLASS 161**
1 3,865,673
6 3,865,674
24 3,865,676
55 3,865,677
67 3,865,678
68 3,865,679
125 3,865,680
170 3,865,682
205 3,865,683

**CLASS 162**
8 3,865,684
78 3,865,685
168 3,865,686
343 3,865,687

**CLASS 164**
46 3,865,173
52 3,865,174
82 3,865,175
87 3,865,176
133 3,865,177
334 3,865,178
340 3,865,179

**CLASS 165**
1 3,865,180
22 3,865,181
27 3,865,182
80 3,865,183
105 3,865,184
165 3,865,185

**CLASS 166**
256 3,865,186
273 3,865,187
285 3,865,188
294 3,865,189
308 3,865,190
315 3,865,191

**CLASS 169**
61 3,865,192
65 3,865,193
70 3,865,194

**CLASS 172**
3 3,865,195
802 3,865,196

**CLASS 173**
23 3,865,197
133 3,865,198

**CLASS 174**
11R 3,865,967
15BH 3,865,968
48 3,865,969
50.53 3,865,970
102R 3,865,971
115 3,865,972

**CLASS 175**
4.51 3,865,199
19 3,865,200
50 3,865,201
393 3,865,202

**CLASS 176**
37 3,865,688

**CLASS 178**
5.8R 3,865,973
6.8 3,865,974
7.1 3,865,975
18 3,865,976
19 3,865,977
46 3,865,980
69.5R 3,865,981

**CLASS 179**
1N 3,865,982
2DP 3,865,983
2A 3,865,984
5P 3,865,985
6R 3,865,986
3,865,987
15AA 3,865,988
15AQ 3,865,989
15BF 3,865,991
15FD 3,865,990
18ES Re.28,337
18GF 3,865,978
3,865,979
18HB 3,865,992
18F 3,865,993
90K 3,865,994
99 3,865,995
100.3G 3,865,996
100.41R 3,865,997
107E 3,865,998
175.2R 3,865,999
189D 3,866,000

**CLASS 180**
2 3,865,203
6.48 3,865,208
12 3,865,204
3,865,205
24 3,865,206
33R Re.28,335
44F 3,865,207
65R 3,865,209
69R 3,865,210
79.2R 3,865,211

**CLASS 181**
33G 3,866,001
43 3,865,212

**CLASS 187**
8.72 3,865,214

**CLASS 188**
73.6 3,865,215
290 3,865,216

**CLASS 190**
48 3,865,217

**CLASS 192**
12C 3,865,218
45.1 3,865,219
46 3,865,220
48.2 3,865,222
58B 3,865,221

**CLASS 193**
42 3,865,223

**CLASS 195**
1.7 3,865,689
28R 3,865,690
49 3,865,691
66B 3,865,692
80R 3,865,693
3,865,694
81 3,865,695

**CLASS 197**
6.7 3,865,224

**CLASS 198**
16R 3,865,225
38 3,865,226
84 3,865,227
176 3,865,228
193 3,865,229
218 3,865,230
220CA 3,865,231
230 3,865,232

**CLASS 200**
33R 3,866,002
38FA 3,866,003
61.42 3,866,004
144B 3,866,005
153LA 3,866,006
283 3,866,007
303 3,866,008

**CLASS 203**
29 3,865,696

**CLASS 204**
15 3,865,697
3,865,698
20 3,865,699
28 3,865,700
3,865,701
49 3,865,702
105R 3,865,703
129.2 3,865,704
130 3,865,705
181 3,865,706
195M 3,865,708
195R 3,865,709
195S 3,865,707
228 3,865,710
275 3,865,711
299 3,865,712

**CLASS 206**
45.19 3,865,233
45.33 3,865,234
286 3,865,235
364 3,865,236
387 3,865,237
404 3,865,238
507 3,865,239

**CLASS 208**
6 3,865,713
238 3,865,714
243 3,865,715
255 3,865,716

**CLASS 209**
1 3,865,717
5 3,865,240
11 3,865,241
143 3,865,242
166 3,865,718
170 3,865,719
240 3,865,243
405 3,865,720

**CLASS 210**
7 3,865,721
42 3,865,722
54 3,865,723
62 3,865,724
73 3,865,725
152 3,865,726
162 3,865,727
169 3,865,728
3,865,729
242 3,865,730
315 3,865,732
359 3,865,731

**CLASS 211**
5 3,865,244
3,865,245
3,865,246
72 3,865,247
90 3,865,248
163 3,865,249
177 3,865,250

**CLASS 212**
71 3,865,251

**CLASS 213**
75R 3,865,252

**CLASS 214**
1BB 3,865,255
1BH 3,865,254
1BT 3,865,253
2.5 3,865,256
5.5 3,865,257
6H 3,865,258
17C 3,865,259
82 3,865,260
83.26 3,865,261
152 3,865,262
451 3,865,264
515 3,865,266
674 3,865,265

**CLASS 215**
206 3,865,267
253 3,865,268
321 3,865,263

**CLASS 219**
10.55 3,866,009
10.57 3,866,010
72 3,866,011
99 3,866,012
121EM 3,866,013
137 3,866,014
146 3,866,015
213 3,866,016
390 3,866,017
460 3,866,018
485 3,866,019

**CLASS 220**
6 3,865,269
85B 3,865,270

**CLASS 221**
96 3,865,271
236 3,865,272

**CLASS 222**
5 3,865,273
37 3,865,274
70 3,865,275
146HE 3,865,277
146C 3,865,276
161 3,865,278
182 3,865,279
193 3,865,280
252 3,865,281
356 3,865,282
402.11 3,865,283

**CLASS 223**
68 3,865,284
73 3,865,285
83 3,865,286
96 3,865,287

**CLASS 224**
2B 3,865,289
5D 3,865,290
42.24 3,865,291
55 3,865,292

**CLASS 225**
2 3,865,293
3,865,294
47 3,865,295
96.5 3,865,288

**CLASS 226**
110 3,865,296

**CLASS 228**
11 3,865,297
20 3,865,298

**CLASS 229**
2.5 3,865,299
7R 3,865,300
14H 3,865,301
43 3,865,302
51TC 3,865,322
62 3,865,303
65 3,865,304

**CLASS 235**
61.11D 3,866,020
92CC 3,866,024
92DM 3,866,022
92DN 3,865,305
92EA 3,866,021
92SH 3,866,023
150.2 3,866,025
151.1 3,866,026
151.11 3,866,027
151.34 3,866,028
152 3,866,029
164 3,866,030
197 3,866,031

**CLASS 237**
2A 3,865,306

**CLASS 238**
366 3,865,307

**CLASS 239**
61 3,865,308
268 3,865,309
283 3,865,310
333 3,865,313
568 3,865,311
585 3,865,312
590.3 3,865,314

**CLASS 240**
1.2 3,866,032
1.3 3,866,033
2B 3,866,034
6.4W 3,866,035
49 3,865,790
51.11R 3,866,036

**CLASS 241**
4 3,865,315
22 3,865,316
169.2 3,865,317
170 3,865,318
188R 3,865,319
278R 3,865,320

**CLASS 242**
18A 3,865,321
55.53 3,865,323
67.1R 3,865,324
68.5 3,865,325
68.6 3,865,326
71.2 3,865,327
71.9 3,865,328
107.4 3,865,329
130 3,865,330
199 3,865,331

**CLASS 244**
102R 3,865,332
151B 3,865,333

**CLASS 248**
4 3,865,334
3,865,335
235 3,865,336
246 3,865,337
295 3,865,338
318 3,865,339
399 3,865,340
404 3,865,341
470 3,865,342

**CLASS 249**
95 3,865,343

**CLASS 250**
216 3,866,037
236 3,866,038
251 3,866,039
281 3,866,040
3,866,041
296 3,866,042
303 3,866,043
3,866,057
310 3,866,044
331 3,866,045
338 3,866,046
360 3,866,047
432 3,865,734
449 3,866,048
487 3,866,049
497 3,866,050
532 3,865,733
551 3,866,051
558 3,866,052
561 3,866,053
562 3,866,054
564 3,866,055
566 3,866,056

**CLASS 251**
284 3,865,344
367 3,865,345

**CLASS 252**
8.55D 3,865,735
11 3,865,736
33.4 3,865,737
46F 3,865,740
47 3,865,739
62.54 3,865,741
63.5 3,865,742
78 3,865,743
188.3R 3,865,744
301.01L 3,865,747
301.01R 3,865,745
301.1W 3,865,746
404 3,865,748
429B 3,865,749
443 3,865,750
457 3,865,751
462 3,865,752
466J 3,865,753
511 Re.28,336
529 3,865,756
532 3,865,754
558 3,865,755

**CLASS 254**
89R 3,865,346
124 3,865,347
132 3,865,348

**CLASS 256**
47 3,865,349

**CLASS 259**
1R 3,865,350
4 3,865,351
3,865,352
118 3,865,353
191 3,865,354
192 3,865,355

**CLASS 260**
2.5AJ 3,865,760
3,865,761
2.5AK 3,865,758
2.5AP 3,865,762
2.5AR 3,865,757
2.5B 3,865,759
5 3,865,763
17R 3,865,764
17.4ST 3,865,765
18S 3,865,766
23AR 3,865,768
23H 3,865,767
27R 3,865,769
3,865,770
29.3 3,865,771
29.6NR 3,865,773
29.6S 3,865,774
29.7H 3,865,772
29.7M 3,865,775
33.6AQ 3,865,776
37EP 3,865,777
37SB 3,865,778
42.44 3,865,779
45.7PS 3,865,780
45.75R 3,865,784
3,865,786
45.75S 3,865,787
45.8N 3,865,781
45.9NP 3,865,783
45.9R 3,865,782
46.5G 3,865,788
47C 3,865,789
3,865,869
75N 3,865,785
77.5CH 3,865,791
78TF 3,865,841
78R 3,865,792
78.5R 3,865,793
79.1 3,865,794
3,865,795
80PS 3,865,796
82 3,865,797
88.3R 3,865,798
92.8A 3,865,799

93.1 3,865,800
112R 3,865,801
123.5 3,865,802
124A 3,865,803
155 3,865,804
205 3,865,805
209D 3,865,807
209R 3,865,806
223 3,865,808
239BD 3,865,811
239BF 3,865,809
239E 3,865,810
239.3D 3,865,815
239.3P 3,865,812
239.3R 3,865,813
3,865,814
239.9 3,865,816
240F 3,865,818
240.2 3,865,817
243C 3,865,819
3,865,820
244R 3,865,821
247.1R 3,865,822
247.2B 3,865,823
247.5D 3,865,826
248NS 3,865,824
251QA 3,865,827
256.4C 3,865,825
268C 3,865,828
282 3,865,829
283P 3,865,830
286R 3,865,831
287R 3,865,832
289AZ 3,865,833
293.54 3,865,834
296R 3,865,835
309.6 3,865,836
326.11R 3,865,837
326.13R 3,865,838
326.28 3,865,839
326.46 3,865,840
330.5 3,865,842
332.2A 3,865,843
332.5 3,865,844
340.9 3,865,845
343.9 3,865,846
346.1M 3,865,848
346.2M 3,865,847
346.8M 3,865,849
347.8 3,865,850
380 3,865,851
402.5 3,865,852
409 3,865,853
410.9R 3,865,854
413 3,865,855
3,865,856
448R 3,865,857
448.2E 3,865,858
448.8R 3,865,859
456A 3,865,860
459 3,865,861
465E 3,865,863
465.3 3,865,864
465.4 3,865,862
465.9 3,865,865
471C 3,865,866
472 3,865,867
475N 3,865,868
524R 3,865,870
3,865,871
526N 3,865,872
530N 3,865,873
535P 3,865,874
553R 3,865,875
581 3,865,876
583H 3,865,877
590 3,865,878
3,865,879
593P 3,865,880
593R 3,865,881
601R 3,865,882
613R 3,865,883
621H 3,865,884
653.3 3,865,885
654R 3,865,886
656R 3,865,887
666A 3,865,888
668B 3,865,889
680R 3,865,891
683D 3,865,892
683.2 3,865,893
683.43 3,865,894
683.51 3,865,896
683.9 3,865,895
827 3,865,897
841 3,865,899
857UN 3,865,900
859R 3,865,898
871 3,865,901
878B 3,865,902
889 3,865,903
901 3,865,904
949 3,865,905
953 3,865,906

**CLASS 261**

18A 3,865,907
77 3,865,908
91 3,865,909
93 3,865,910
140 3,865,911

**CLASS 264**

25 3,865,912
40 3,865,913
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139 3,865,356
140 3,865,358

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**CLASS 270**

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**CLASS 271**

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13 3,865,436
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54 3,865,441

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43 3,866,060
208 3,866,061
228 3,866,062
230 3,866,063
251 3,866,064
260 3,866,065
297 3,866,066
311 3,866,067

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138 3,865,443
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8.7 3,866,069
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214 3,866,070
260 3,866,073

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111.2 3,866,089
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230 3,866,095
262A 3,866,096

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251 3,866,098
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487 3,866,101
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25 3,866,158

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72 3,865,930
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181 3,865,935
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297 3,865,963
307 3,865,964
372 3,865,966
519 3,865,965

**CLASS 431**

13 3,865,537
215 3,865,538
255 3,865,539

**CLASS 432**

2 3,865,540
13 3,865,541

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D 1— | 2 | 234,275 | D 7— | 62 | 234,284 | | 169 | 234,293 | | | 234,302 | D48— | 24R | 234,311 | D74— | 1C | 234,320 |
| D 6— | 25 | 234,276 | | 85 | 234,285 | | 192 | 234,294 | | | 234,303 | D52— | 4A | 234,314 | D83— | J | 234,321 |
| | 26 | 234,277 | | 107 | 234,286 | D12— | 144 | 234,295 | D30— | 99 | 234,304 | D54— | 14 | 234,313 | D86— | 8 | 234,322 |
| | 32 | 234,278 | | 141 | 234,287 | D13— | 1B | 234,296 | D34— | 5CQ | 234,306 | D56— | 1B | 234,312 | | 10E | 234,323 |
| | 67 | 234,279 | | 191 | 234,288 | D22— | 27 | 234,297 | | K | 234,305 | | 4R | 234,315 | | | 234,324 |
| | 70 | 234,280 | D 8— | 8 | 234,289 | D23— | 2 | 234,298 | | | 234,309 | | | 234,316 | D87— | 1D | 234,325 |
| | 76 | 234,281 | | 98 | 234,290 | | 86 | 234,299 | | 15LL | 234,307 | D61— | 1B | 234,317 | | 3F | 234,326 |
| | 97 | 234,282 | D 9— | 72 | 234,291 | | 163 | 234,300 | | | 234,308 | D67— | 2A | 234,319 | D92— | 15 | 234,327 |
| | 120 | 234,283 | | 119 | 234,292 | D26— | 5C | 234,301 | D45— | 16A | 234,310 | | 4 | 234,318 | D98— | 1A | 234,328 |

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## PLANT PATENTS

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Frederick B. Dent, *Secretary*

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